BOSTON LOGAN INTERNATIONAL AIRPORT

2018/2019 EDR

ENVIRONMENTAL DATA REPORT

December 2020

EEA #3247

SUBMITTED TO

Executive Office of Energy and Environmental Affairs, MEPA Office

SUBMITTED BY

Massachusetts Port Authority
Strategic & Business Planning

PREPARED BY

vhb

IN ASSOCIATION WITH

Harris Miller Miller & Hanson
KB Environmental Sciences
ICF
Inter*VISTAS* Consulting

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December 31, 2020

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

Re: Boston Logan International Airport 2018/2019 Environmental Data Report - EEA #3247

Dear Secretary Theoharides and Director Kim:

On behalf of the Massachusetts Port Authority (Massport), we are pleased to submit this *2018/2019 Environmental Data Report* (EDR) for Boston Logan International Airport. This filing continues Massport's nearly four-decade practice of providing an extensive record of Logan Airport environmental trends, facility planning, operations and passenger data, and Massport's mitigation commitments. As a follow-up to the *2017 Environmental Status and Planning Report (ESPR)*, and with the Secretary's approval, this EDR combines reporting for 2018 and 2019.

This EDR was prepared in 2020 during the ongoing COVID-19 worldwide pandemic. Accordingly, Massport has strived to include relevant updates through fall 2020. The dramatic nature of the COVID-19 pandemic, and its impacts to the broader world, the U.S. and local economies, and to the aviation industry in particular, triggered a significant decline in Massport's financial condition, causing deferrals to projects or programs that were in place in 2018 and 2019 and planned for 2020 and beyond.

Beginning in March 2020, flights in and out of Logan Airport were dramatically reduced and passenger levels dropped by over 90 percent at the peak of the pandemic in the spring and summer of 2020. As a result, there are far fewer aircraft operations and passengers and a dramatic drop in overall Logan Airport activity. While activity levels began a slow recovery in mid-summer 2020, the ongoing wave of COVID-19 cases has resulted in continued historically low levels of activity, with a full recovery years away. As of October 2020, total flight operations are down by 50 percent and passenger levels are down by about 70 percent compared to 2019. Massport expects 2020 annual passenger levels to have dropped to levels of activity not seen since the mid-1970s.

As a result of this significant reduction in Airport activity and dramatic reduction in revenues, both Massport and our airline and other tenants have adjusted their capital and operations plans. Concurrently, the schedule for a number of Airport projects and programs have been revised significantly. In an effort to be as transparent as possible, Chapter 3, *Airport Planning* includes the most current project updates through October 2020.

The growth at Logan Airport that was experienced through early 2020 was tied closely to the strong local, regional, national, and international economies and its role as the major airport to a region that is the home to world-class educational and medical institutions, cutting-edge technology companies, rich historical resources, and extensive tourism. Logan Airport's recovery and the timeframe once the COVID-19 pandemic ends will similarly be driven by the national and regional economic recovery.

Massport continues to evaluate and plan for the recovery of aircraft operations and air passenger activity and remains committed to implementing the broad range of environmental and operating strategies designed to reduce the impacts associated with Airport operations. However, there is high uncertainty regarding the duration of Massport's financial crisis and the timing of flights, passenger, and business recovery. As a result, the deferral of certain projects and programs will be evaluated on an ongoing basis. Forthcoming EDRs will continue to provide operations, project, and programmatic updates, as available.

As we look forward, Massport will continue to seek opportunities to implement measures designed to reduce Logan Airport's operating and environmental impacts. Such measures will be tied to High Occupancy Vehicle (HOV) strategies, noise abatement procedures, emission reduction and energy efficiency measures, as well as continued information sharing with interested stakeholders and our neighbors. Additionally, this EDR, in response to community input, includes an expansion of the discussions on the evolving science and studies of aircraft noise and emissions and associated public health investigations. Through both this EDR and future EDRs/ESPRs, we hope both to share most recent, available information and, where possible, support those studies that will ultimately guide evolving regulations and mitigation strategies.

EDR Content and Structure

The *2018/2019 EDR* responds to the Secretary's Certificate on the *Boston Logan International Airport 2017 ESPR* dated November 25, 2019. The EDR also updates 2018 and 2019 (and later where available) conditions for the following categories:

- Passenger levels, aircraft operations, aircraft fleets, and cargo volumes;
- Planning, design, and construction activities at Logan Airport;
- Regional transportation statistics and initiatives;
- Key environmental indicators (Ground Access, Noise Abatement, Air Quality/Emissions Reduction, and Environmental Compliance and Management/Water Quality);
- Status of Logan Airport project mitigation; and
- Sustainability initiatives.

The *2018/2019 EDR* includes the Secretary's Certificate on the *2017 ESPR* and associated comment letters. Recent Certificates received on the Logan Airport Parking Project (EEA# 15665) and Terminal E Modernization Project (EEA# 15434), which included items to be addressed in future EDRs and the ESPR are also included. Appendix D, *Distribution* presents the EDR distribution list and supporting technical appendices are included in the attached CD.

Review Period, Distribution, and Consultation

Massport has requested EEA's consideration of an *extended* 45-day public comment period for this EDR in consideration of the multi-year nature of this document. Based on this request, the public comment period will begin on January 6, 2021, the publication date of the next MEPA *Environmental Monitor*, and will end on February 22, 2021. The distribution list included as Appendix D indicates which listed parties will receive a printed copy of this EDR or notice of availability with a link to the document on Massport's website. As with the recent EDRs and other Massport environmental filings, this EDR is presented in its entirety on Massport's website (http://www.massport.com/massport/about-massport/project-environmental-filings/).

A public virtual consultation session on the *2018/2019 EDR* will be planned for late January/early February 2021. Details on the date of the meeting will be posted on Massport's website at https://www.massport.com/massport/about-massport/project-environmental-filings/. Additional copies of the *2018/2019 EDR* may be obtained by calling (617) 568-3546 or emailing bwashburn@massport.com during the public comment period.

We look forward to your review of this document and to consultation with the MEPA Office and other reviewers. Please feel free to contact me at sdalzell@massport.com, if you have any questions.

Sincerely,

Massachusetts Port Authority

Stewart Dalzell

Stewart Dalzell, Deputy Director
Environmental Planning & Permitting,
Strategic & Business Planning Department

cc: J. Barrera, F. Leo, A. Coppola, C. McDonald, B. Washburn/Massport

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MEPA Appendices

Technical Appendices (Located on the Attached CD)

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Acronyms

This section provides a list of acronyms and abbreviations that are found in the *2018/2019 EDR*.

A

AAAE	American Association of Airport Executives
AADT	Annual Average Daily Traffic
ACI-NA	Airports Council International – North America
ACRP	Airport Cooperative Research Program
ASCENT	Aviation Sustainability Center
AEDT	Aviation Environmental Design Tool
AFV	Alternative Fuel Vehicle
ALP	Airport Layout Plan
APU	Auxiliary Power Unit
ARFF	Airport Rescue and Fire Fighting
ARRA	American Recovery and Reinvestment Act
ASPM	Aviation System Performance Metrics
AST	Aboveground Storage Tanks
ATMS	Automated Traffic Monitoring System
AUL	Activity and Use Limitation
AWDT	Annual Average Weekday Daily Traffic
AWEDT	Annual Average Weekend Daily Traffic

B

BC	Black Carbon
BDL	Bradley International Airport, CT airport code
BED	Hanscom Field, MA airport code
BGR	Bangor International Airport, ME airport code
BIF	Bird Island Flats
BLANS	Boston Logan Airport Noise Study
BMP	Best Management Practice
BOS	Boston Logan International Airport, MA airport code
BRT	Bus Rapid Transit
BTV	Burlington International Airport, VT airport code
BWSC	Boston Water and Sewer Commission

C

CAA	Clean Air Act
CAA	Connecticut Airport Authority
CAC	Community Advisory Committee
CACI	Clean Air Construction Initiative
CAEP	Committee on Aviation Environmental Protection
CAGR	Compound Annual Growth
CA/T	Central Artery/Tunnel
CAT III	Category III (instrument landing system)

CBP U.S. Customs and Border Protection
CEDDS Complete Economic and Demographic Data Source
CFC Chlorofluorocarbon
CH_4 Methane
CMR Code of Massachusetts Regulations
CNG Compressed Natural Gas
CNI Cumulative Noise Index
CO Carbon monoxide
CO_2 Carbon dioxide
CO_2eq CO_2 equivalents
CONEG Conference of New England Governors
ConnDOT Connecticut Department of Transportation
CORSIA Carbon Offsetting and Reduction Scheme for International Aviation
CRO Converging Runway Operations
CTPS Central Transportation Planning Staff
CY Calendar Year

D

dB Decibel
dBA A-weighted decibel
DERA Diesel Emission Reduction Act
DFS Department of Fire Services
DIRP Disaster and Infrastructure Resiliency Planning Study
DNL Day-Night Average Sound Level
DPH Department of Public Health
DOT U.S. Department of Transportation

E

EA Environmental Assessment
EDR Environmental Data Report
EDMS Emissions and Dispersion Modeling System
EEA Executive Office of Energy and Environmental Affairs
eGSE Electric Ground Service Equipment
EIR Environmental Impact Report
EIS Environmental Impact Statement
EMAS Engineered Materials Arresting System
EMS Environmental Management System
ENF Environmental Notification Form
EPA U.S. Environmental Protection Agency
EPNL Effective Perceived Noise Level
EPNdB Effective Perceived Noise Level (units)
ESMF Equipment Storage and Maintenance Facility
ESPR Environmental Status and Planning Report
EV Electric Vehicle

F

FAA Federal Aviation Administration
FAR Federal Aviation Regulation
FBO Fixed Base Operator
FDS Fuel Distribution System
FEIR Final Environmental Impact Report
FIS Federal Inspection Services

FOA	First Order Approximation
FONSI	Finding of No Significant Impact
FRA	Federal Railroad Administration
FY	Fiscal Year
G	
GA	General Aviation
GAO	Government Accounting Office
GDP	Gross Domestic Product
GEIR	Generic Environmental Impact Report
GHG	Greenhouse Gas
GIS	Geographic Information Systems
gpm	gallons per minute
GPS	Global Positioning System
GSA	General Services Administration
GSE	Ground Service Equipment
GTOC	Ground Transportation Operations Center
GWP	Global Warming Potential
H	
HAPS	Hazardous Air Pollutants
HCFC	Hydrochlorofluorocarbon
HOV	High Occupancy Vehicle
HVAC	Heating, Ventilation, and Air Conditioning
HVN	Tweed New Haven Airport, CT airport code
Hz	Hertz
I	
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
INM	Integrated Noise Model
IPCC	Intergovernmental Panel on Climate Change
IRA	Immediate Response Action
ISA	Inclined Safety Area
ISO	International Organization for Standardization
J	
JFK	John F. Kennedy International Airport, NY airport code
JOC	Joint Operations Center
K	
kBTU	Thousand British Thermal Units
kg	Kilogram
kWh	Kilowatt-hours
L	
lbs	Pounds
LCC	Low-Cost Carriers
LDMS	Logan Dispersion Modeling System
LED	Light-Emitting Diode
LEED®	Leadership in Energy and Environmental Design
LIAG	Logan Impact Advisory Group
LTO	Landing and Takeoff

M

M.G.L.	Massachusetts General Laws
MAPC	Metropolitan Area Planning Council
MassDEP	Massachusetts Department of Environmental Protection
MassDMF	Massachusetts Division of Marine Fisheries
MassDOT	Massachusetts Department of Transportation
Massport	Massachusetts Port Authority
MBTA	Massachusetts Bay Transportation Authority
MCO	Orlando International Airport, FL airport code
MCP	Massachusetts Contingency Plan
MEPA	Massachusetts Environmental Policy Act
MHT	Manchester-Boston Regional Airport, NH airport code
MIT	Massachusetts Institute of Technology
MMT	Million Metric Tons
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MOVES	Motor Vehicle Emission Simulator
MPO	Metropolitan Planning Organization
mph	Miles per hour
MT	Metric tones

N

NA	Not Available
NAAQS	National Ambient Air Quality Standards
NCA	North Cargo Area
NCI	Noise Complaint Initiative
NEC	Northeast Corridor
NEG/ECP	Conference of New England Governors and Eastern Canadian Premiers
NEPA	National Environmental Policy Act of 1969
NERASP	New England Regional Airport System Plan
NHESP	Natural Heritage and Endangered Species Program
NO_2	Nitrogen dioxide
NOMS	Noise and Operations Monitoring System
NO_x	Nitrogen oxides
NPC	Notice of Project Change
NPDES	National Pollutant Discharge Elimination System
NPSI	Noise Per Seat Index
NSA	North Service Area

O

O_3	Ozone
ORH	Worcester Regional Airport, MA airport code
ORT	Ozone Transport Region
O&D	Origin and Destination

P

PAH	Polycyclic Aromatic Hydrocarbon
PARC	Parking and Revenue Control
PARTNER	Partnership for Air Transportation Noise and Emissions Reduction
PATCO	Professional Air Traffic Controllers Organization
Pb	Lead
PBN	Performance-Based Navigation

PCA	Pre-Conditioned Air
PM	Particulate Matter (e.g., PM_{10}, $PM_{2.5}$)
ppm	Parts per million
PPA	Power Purchase Agreement
PRAS	Preferential Runway Advisory System
PSM	Portsmouth International Airport at Pease, NH airport code
PVD	T.F. Green Airport, Warwick RI airport code
PWM	Portland International Jetport, ME airport code

Q

QTA	Quick Turnaround Areas

R

RACT	Reasonably Available Control Technology
RAM	Release Abatement Measure
RAO	Response Action Outcome
RCC	Rental Car Center
REC	Renewable Energy Credit
RFI	Request for Information
RFP	Request for Proposals
RIAC	Rhode Island Airport Corporation
RideApp	Ride Application such as Uber or Lyft
RIDOT	Rhode Island Department of Transportation
RIM	Runway Incursion Mitigation
RJ	Regional Jet
RNAV	aRea Navigation
ROD	Record of Decision
RON	Remain Over Night
RNP	Required Navigation Performance
RPZ	Runway Protection Zone
RSA	Runway Safety Area
RSIP	Residential Sound Insulation Program
RTC	Regional Transportation Center
RTN	Release Tracking Number

S

SAF	Sustainable Aviation Fuel
SCA	South Cargo Area
SDSG	Sustainable Design Standards and Guidelines
SIP	State Implementation Plan
SL1	Silver Line
SMART	Solar Massachusetts Renewable Target Program
SMP	Sustainability Management Plan
SO_2	Sulfur dioxide
SOV	Single Occupancy Vehicle
SPCC	Spill Prevention Control and Countermeasure Plan
SPL	Sound Pressure Level
SRE	Snow Removal Equipment
STEM	Science, Technology, Engineering, and Mathematics
SWPPP	Stormwater Pollution Prevention Plan
SWSA	Southwest Service Area

T

TA	Time Above
TAA	Tenant Alteration Application
TAF	Terminal Area Forecast
TDM	Transportation Demand Management
TIM	Time-in-Mode
TMA	Transportation Management Association
TNC	Transportation Network Company, also known as RideApp
tpy	Tons per year
TRB	Transportation Research Board
TSA	Transportation Security Administration
TSS	Total Suspended Solids

U

UAS	Unmanned Aircraft Systems
UFP	Ultrafine Particles
ULCC	Ultra Low-Cost Carriers
USC	United States Code
USGBC	U.S. Green Building Council
UST	Underground Storage Tank

V

VALE	Voluntary Airport Low Emissions Program
VMT	Vehicle Miles Traveled
VNM	Virtual Noise Monitors
VOC	Volatile Organic Compounds
VW	Volkswagen

W

WET	Whole Effluent Toxicity
WHO	World Health Organization

Other

$\mu g/m^3$	Micrograms of pollutant per cubic meter
µm	Micrometers

1

Introduction/Executive Summary

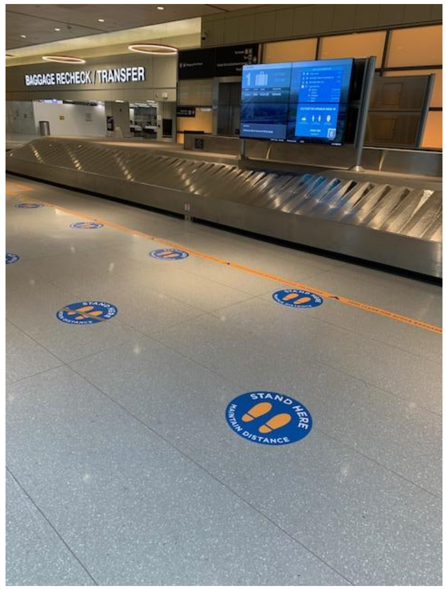
Introduction

The Massachusetts Port Authority (Massport) is continuing its nearly four-decade practice of providing an extensive record of Boston Logan International Airport (Logan Airport or Airport) environmental trends, facility planning, operations and passenger levels, and Massport's mitigation commitments in this *Boston Logan International Airport 2018/2019 Environmental Data Report (EDR)*. As Massport has done periodically following circulation and review of our Environmental Status and Planning Reports (ESPRs), with the approval of the Secretary of the Massachusetts Executive Office of Energy and Environmental Affairs (EEA), this *2018/2019 EDR* combines data and analysis for calendar years 2018 and 2019.

This EDR was prepared in 2020 during the ongoing COVID-19 pandemic. Massport has strived to include relevant updates through fall 2020 where the current conditions have resulted in changes in projects or programs that were in place in 2018 and 2019. Beginning in March 2020, flights in and out of Logan Airport were dramatically reduced and passenger levels dropped by over 90 percent at the peak of the pandemic in the spring and summer of 2020. As a result, currently there are far fewer aircraft operations and passengers and a dramatic drop in overall Logan Airport activity. While activity levels began a slow recovery in mid-summer 2020, the ongoing wave of COVID-19 cases has resulted in continued historically low levels of activity, with a full recovery anticipated years away. As of October 2020, total flight operations for the year were down by approximately 50 percent and passenger levels were down by about 70 percent compared to January through October 2019. Massport expects that by the end of 2020, passenger levels will have dropped to levels of activity not seen since the mid-1970s.

Air traffic declines caused by economic recessions and other "shocks" such as the events of September 11, 2001 and the Great Recession in 2008/2009 have been followed by gradual recovery cycles. As depicted in **Figure 1-1**, after the events of September 11, 2001 and the subsequent recession, Logan Airport's passenger activity levels declined by about 18 percent, yet recovered five years later. Logan Airport's passenger volumes declined by about 9 percent after the Great Recession of 2008/2009. As shown in **Figure 1-2**, in 2020 the seven-day average Transportation Security Administration (TSA) passenger screening throughput dropped by over 90 percent very quickly. **Figure 1-3** shows the percent change in monthly TSA throughput from 2019 to 2020 for the nation and Boston.

COVID-19 is having an unprecedented impact on not just the aviation industry but the global economy. While the immediate and most pressing concern is human cost, COVID-19 has created profound implications for nearly all businesses and industries. The impact on aviation has been particularly severe. The situation is changing on a daily basis and there remains considerable uncertainty as to how long this pandemic will last and what will be the long-term impacts.

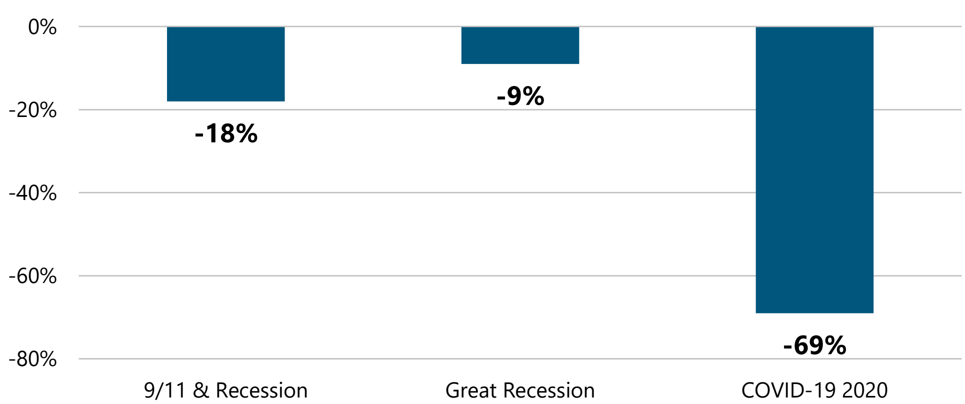


Source: Massport.

Notes: Logan Airport terminal (left) and baggage claim area (right) during the COVID-19 pandemic.

As a result of this significant reduction in Airport activity and dramatic reduction in revenues, both Massport and our airlines and other tenants have necessarily adjusted and scaled back their operations. Concurrently, the schedule for a number of Airport projects and programs have been revised and pushed back. To be as transparent as possible, Chapter 3, *Airport Planning* includes the most current project updates through October 2020. Forthcoming EDRs will continue to provide updates, as available. Overall, Massport continues to evaluate and plan for the recovery of aircraft operations and air passenger activity and remains committed to implementing the broad range of environmental and operating strategies designed to reduce the impacts associated with Airport operations.

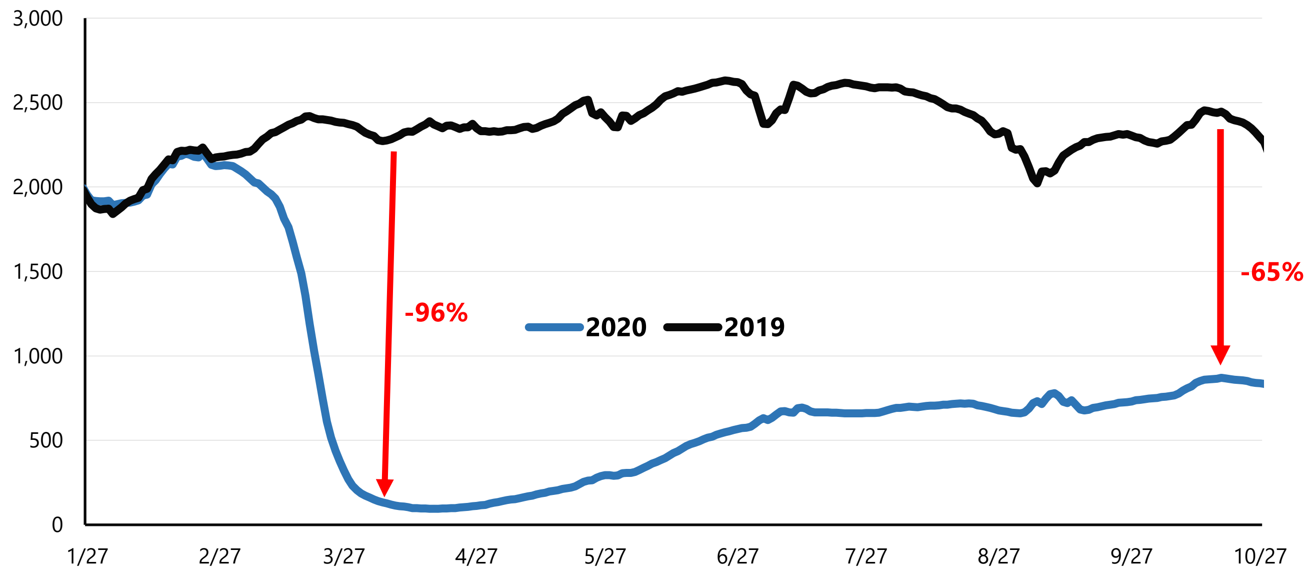
Figure 1-1 Change to Logan Airport Passenger Growth After Recent Recessions



Source: InterVISTAS: Massport traffic statistics.

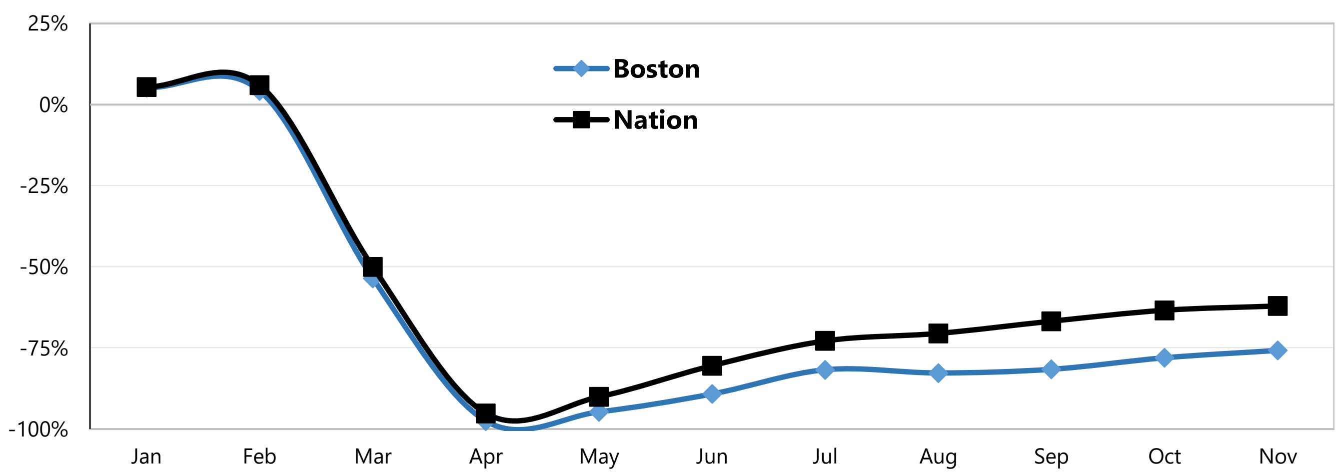
Note: COVID-19 2020 change is the year-to-date October 2020 vs. 2019.

Figure 1-2: Seven Day Average TSA Throughput at U.S. Airports, 2019 vs. 2020



Source: TSA Daily Reports.

Figure 1-3: Percent Change in Monthly TSA Throughout From Prior Year, January 2020 to November 2020



Source: TSA Daily Reports.

Logan Airport, owned and operated by Massport, plays a key role in the metropolitan Boston and New England passenger and freight transportation networks; it is the primary airport serving the Boston metropolitan area, the principal New England airport for long-haul services, and a major U.S. international gateway airport for transatlantic services. The Airport boundary encompasses approximately 2,400 acres in East Boston and Winthrop, including approximately 700 acres in Boston Harbor. Logan Airport's airfield comprises six runways, approximately 15 miles of taxiway, and approximately 240 acres of concrete and asphalt apron. Logan Airport has four interconnected passenger terminals (Terminals A, B, C, and E), each with its own ticketing, baggage claim,

and ground transportation facilities. The Airport is less than a three-mile drive from downtown Boston and is accessible by public transit lines, several direct bus lines, and a well-connected roadway system. Massport provides Logan Express bus service to and from Logan Airport for air passengers and employees from a series of park-and-ride lots.

This *2018/2019 EDR* is one in a series of annual environmental review documents submitted to the Secretary of EEA, in accordance with the Massachusetts Environmental Policy Act (MEPA).[1] Since 1979, Massport has submitted these documents to report on the cumulative environmental effects of Logan Airport's operations and activities. Logan Airport is the first airport in the nation for which an annual environmental assessment on airport activities was prepared, and Massport continues to be a leader in environmental reporting.

Approximately every five years, Massport prepares an ESPR, which provides a historical and prospective view of Logan Airport. EDRs, prepared annually in the intervals between ESPRs, provide an historical review of environmental conditions for the reporting year compared to the previous year. This *2018/2019 EDR* follows the *2017 ESPR* which reported on 2017 conditions and included projections and analyses of future operating and environmental conditions based on a pre-COVID-19 passenger forecast. While Massport and the entire aviation industry continue to adjust to the new operating conditions, we continue to evaluate the pandemic's current and future impacts. Where possible, this EDR includes relevant information and updates. However, more detailed projections and analyses will necessarily need to be addressed in future ESPRs.

The scope for this combined *2018/2019 EDR* was established by the Secretary's Certificate on the *2017 ESPR* dated November 25, 2019, which is included in Appendix A, *MEPA Certificates and Responses to Comments*. This EDR fulfills all the requirements laid out in the Secretary's Certificate on the *2017 ESPR* and includes responses to comments on the Secretary's Certificate and updates and compares the data presented in the *2017 ESPR* for the following subjects:

- Activity Levels (including aircraft operations, passenger activity, and cargo volumes)
- Air Quality/Emissions Reduction
- Logan Airport's Role in the Regional Transportation Network
- Ground Access to and from the Airport
- Noise Abatement
- Airport Planning (including activities underway and upcoming projects)
- Water Quality/Environmental Compliance
- Sustainability and Resiliency
- Environmentally Beneficial Measures and Mitigation Commitments

To enhance the usefulness of this EDR as a reference document for reviewers, this report also presents historical data on the environmental conditions at Logan Airport dating back to 1990, in instances where historical information is available. When appropriate and available, this EDR also includes updates through fall 2020.

1 Massachusetts General Laws Chapter 30, Sections 61-62H. MEPA is implemented by regulations published at 301 Code of Massachusetts Regulations (CMR) 11.00 ("the MEPA Regulations").

This EDR includes a Spanish translation of this chapter. This translated version is included after the English-version of the Executive Summary.

EEA # 3247

Submitted By

Massachusetts Port Authority
One Harborside Drive, Suite 200S
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Logan Airport Environmental Review Process

This *2018/2019 EDR* is Massport's next filing in its unique, but well-established, formal state-level environmental review process that assesses Logan Airport's cumulative environmental impacts. The documents provide a current and historical context against which individual projects at Logan Airport meeting state and federal environmental review thresholds are evaluated on a project-specific basis. The Airport-wide and project-specific environmental review processes are described below.

Historical Context for the Logan Airport EDR/ESPR Process

In 1979, the Secretary of EEA issued a Certificate requiring Massport to define, evaluate, and disclose every three years the impact of long-term growth at the Airport through a Generic Environmental Impact Report (GEIR). The Certificate also required interim Annual Updates to provide data on conditions for the years between GEIRs. The GEIR evolved into an effective planning tool for Massport and provided projections of environmental conditions so that the cumulative effects of individual projects could be evaluated within a broader context.

EEA eliminated GEIRs following the 1998 revisions to its MEPA regulations. However, the Secretary's Certificate on the 1997 Annual Update[2] proposed a revised environmental review process for Logan Airport resulting in Massport's preparation of subsequent EDRs/ESPRs. The more comprehensive ESPRs provide a long-range analysis of projected operations, passengers, and cumulative impacts, while EDRs are prepared annually to provide a review of environmental conditions for the reporting year compared to the previous year. The EDR/ESPR process was developed to allow individual projects at Logan Airport to be considered and analyzed in the broader, Airport-wide context. As stated in the introduction to the *1999 ESPR*, "while the Logan ESPR and EDRs provide the broad planning context for projects proposed for Logan Airport and future planning concepts under consideration by Massport, no specific projects can be built solely on the basis of inclusion and discussion

2 Certificate of the Secretary of the Executive Office of Environmental Affairs on the Logan Airport 1997 Annual Update, issued on October 16, 1998.

in the *1999 ESPR."* It continues to state that projects that meet MEPA or NEPA review thresholds must undergo those processes, as needed. In short, the EDRs/ESPRs provide a cumulative planning context which complements the individual project-specific filings.

In 2018 and 2019, while passenger levels experienced significant growth, reaching new peaks, aircraft operations and associated environmental effects remained well below levels previously analyzed for Logan Airport. Thus, the forecasted aviation growth presented in the *2004 ESPR*, the predicate upon which the ESPR schedule was initially established, has not occurred. Accordingly, with the approval of the Secretary, Massport prepared *2009* and *2010 EDRs* in lieu of the ESPR originally planned for 2009. The *2011 ESPR*, filed in early 2013, reported on calendar year 2011 and updated passenger activity level and aircraft operations forecasts. The combined *2012/2013 EDR* presented conditions for both calendar years 2012 and 2013. The *2014 EDR*, *2015 EDR*, and *2016 EDR* presented conditions for calendar years 2014, 2015, and 2016, respectively. Similarly, with strong passenger growth and evolving ground access trends with the emerging RideApp industry (formerly referred to as transportation network companies [TNCs]), EEA allowed Massport to defer the *2016 ESPR*.

The *2017 ESPR* provided a comprehensive, cumulative analysis of activity levels and environmental conditions for 2017 and a Future Planning Horizon. In the ESPR, Massport proposed preparation of a combined *2018/2019 EDR* to report the effects of all Logan Airport activities based on actual passenger activity and aircraft operations in 2018 and 2019. This document responds to EEA approval of the combined *2018/2019 EDR*.

While this report is largely focused on 2018 and 2019, Massport has included the best available information on 2020 as the Authority and the nation react to the COVID-19 pandemic. Where appropriate, Massport will continue to identify and address any longer-term aviation and environmental trends in both EDRs and ESPRs.
Project-Specific Review

While this Airport-wide review provides the broad planning context for proposed projects and future planning concepts, certain Airport projects are also subject to a project-specific, public environmental review process when they meet state environmental review thresholds. When required, Massport and Airport tenants submit Environmental Notification Forms (ENFs) and Environmental Impact Reports (EIRs) pursuant to MEPA. Similarly, where NEPA[3] environmental review is triggered, projects are reviewed under the NEPA environmental review process. Current and potential future projects anticipated to undergo MEPA and/or NEPA review are discussed in Chapter 3, *Airport Planning*.

Logan Airport Planning Context

Logan Airport plays a key role in the metropolitan Boston and New England passenger and freight transportation networks. The Airport is one of the most land-constrained airports in the nation and is surrounded on three sides by Boston Harbor (see **Figures 1-4** and **1-5**).

3 42 USC Section 4321 et seq. The Federal Aviation Administration (FAA) implements NEPA through FAA Order 1050.1E, Environmental Impacts: Policies and Procedures, Federal Aviation Administration, United States Department of Transportation, Effective Date: March 20, 2006.

FIGURE 1-4 Aerial View of Logan Airport

2018/2019 Environmental Data Report

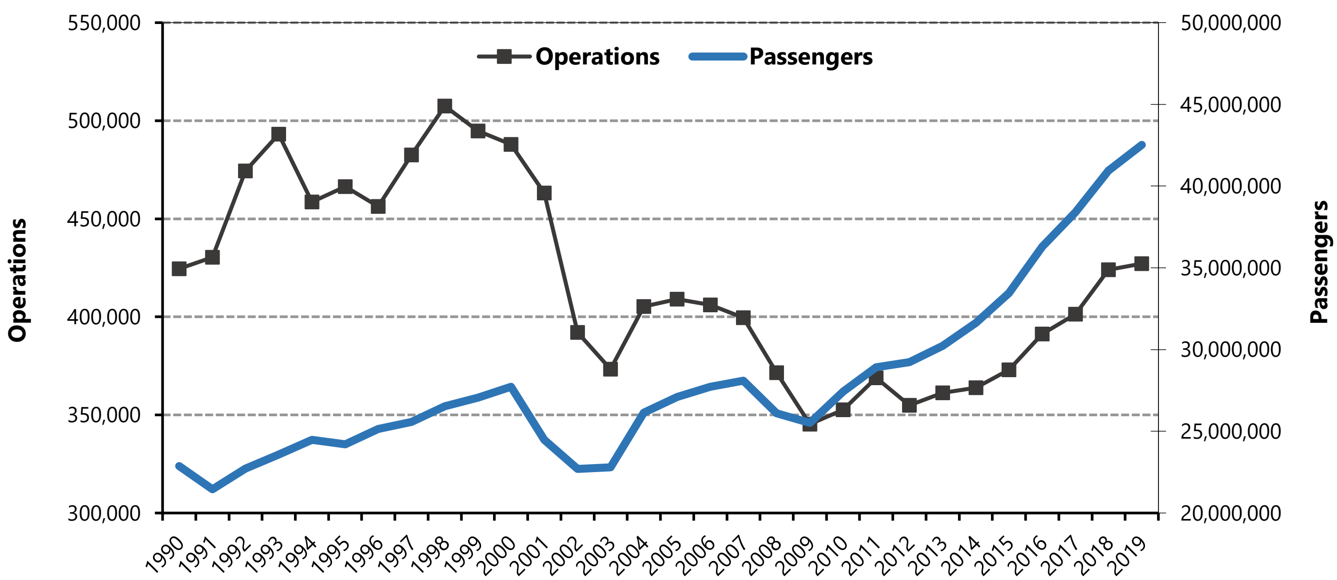
FIGURE 1-5 Logan Airport and Environs

2018/2019 Environmental Data Report

Passenger and Aircraft Activity Growth at Logan Airport

In 2019, air passenger activity levels at Logan Airport reached an all-time high of 42.5 million, an increase of 3.9 percent over 2018 (40.9 million). As has been the recent trend prior to March 2020, aircraft operations increased at a slower rate than passengers. In 2019, operations totaled 427,176 and 2018 operations totaled 424,024. These levels both represent increases compared to the 2017 passenger levels of 38.4 million and 401,371 operations (**Figure 1-6**). The growth seen during 2018 and 2019 was directly correlated to the strong national and regional economies. Even with this strong growth, aircraft operations remained well below the 487,996 operations in 2000 and the historic peak of 507,449 operations reached in 1998. The slower growth in aircraft operations compared to passenger levels is due to the steady increase in aircraft size and improving aircraft load factors (passengers/available seats).

Figure 1-6 Logan Airport Annual Passenger Levels and Aircraft Operations (1990–2019)



Due to COVID-19, 2020 passenger levels and operations have dramatically decreased. As of October 2020, year-over-year passenger levels and operations are down by approximately 70 percent and 50 percent.

Logan Airport Activity Levels are Closely Tied to the Regional and National Economy

Activity levels at Logan Airport are largely driven by the local, regional, and national economies. As can be seen by looking at long-term trends, it is clear that when the economy is strong, Logan Airport grows. Similarly, the most significant declines in passenger levels and aircraft operation track closely with significant national and international disruptions. Examples of the most significant declines include the Professional Air Traffic Controllers Organization (PATCO) strike in 1981, September 11, 2001, the Great Recession in 2008/2009, and now the COVID-19 pandemic.

When there has been significant growth, as was observed through 2018 and 2019, Massport has implemented strategies to address that growth in a manner that allows Logan Airport to evolve in a sustainable and environmentally responsible way.

Logan Airport is the largest airport in the six-state New England region, which has a population of approximately 14.8 million residents. The Airport is located in Massachusetts, which is home to 6.9 million residents, or nearly 46 percent of New England's population. Logan Airport serves passengers from across New England, with its primary catchment area consisting of five Massachusetts counties: Essex, Middlesex, Norfolk, Plymouth, and Suffolk (which includes the City of Boston). According to the most recently available statistics, 4.4 million people reside in this five-county area, and population within the catchment area is projected to increase by 0.5 percent per year over the next 19 years.[4] In 2019, similar to past years, the Boston metropolitan area maintained a lower unemployment rate (2.6 percent) than that of the Commonwealth (2.9 percent) and the entire country (3.7 percent).[5] The Airport not only serves a growing population, but a high earning one as well. Per capita income in 2019 was $68,361 (2012 U.S. dollars) in the Airport's primary service area, 3.6 percent higher than the Commonwealth and 35.9 percent higher than the national average.[6]

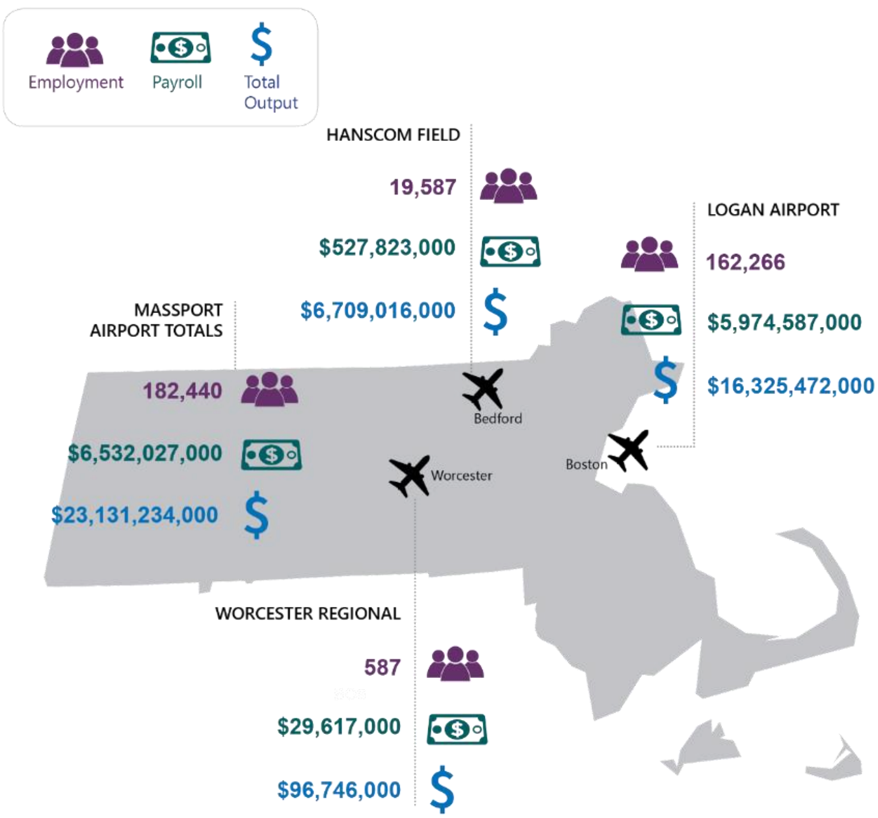
Logan Airport is a key transportation and economic resource in the New England region, the state, and the Boston metropolitan area, which is home to a broad range of industries. The industries accounting for the largest share of employees include: healthcare and social assistance; educational services; and professional, scientific, and technology services (which include Boston's thriving biotech industry).[7] In 2018 and 2019, Boston was ranked the #1 city in the U.S. for education and #2 in healthcare.[8] The contribution of innovation and business start-ups is also evident in the latest 2019 economic growth estimates.

In addition to supporting the growth and economic success of the state, Logan Airport and the airport industry are important elements in the state and regional economy. The *Massachusetts Statewide Airport Economic Impact Study Update,* completed by the Massachusetts Department of Transportation

4 Woods & Poole Economics, Inc. 2019. Complete Economic and Demographic Data Source (CEDDS).
5 U.S. Bureau of Labor Statistics. 2020.
6 Woods & Poole Economics, Inc. 2019. ICF analysis of population and personal income datasets.
7 U.S. Census Bureau via DataUSA. Boston-Cambridge, Newton, MA-NH Metro Area profile. wwww.datausa.io.
8 U.S. News & World Report 2020. Massachusetts.

(MassDOT) in 2014 and most recently updated in 2019,[9] estimates that Massport airports – inclusive of Logan Airport, Worcester Regional Airport, and Hanscom Field – contribute approximately $23.1 billion in output to the Massachusetts economy annually; of this output, 71 percent is due to Logan Airport alone.[10] Total output includes on-Airport businesses, construction, visitor, and multiplier effects (see **Figure 1-7**).[11] Logan Airport supports over 162,000 direct and indirect jobs, while generating approximately $16.3 billion per year in total economic output.[12] In 2019, over 23,000 people were employed at Logan Airport. This included approximately 820 Massport Logan Airport staff and additional administrative employees.[13]

Figure 1-7 Total Economic Impact of Massport Airports



Source: MassDOT, Massachusetts Statewide Airport Economic Impact Study Update, 2019.
Notes: "Massachusetts Totals" refers to the total economic output of all Massachusetts airports.

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9 MassDOT. 2014. *Massachusetts Statewide Airport Economic Impact Study Update*. http://www.massdot.state.ma.us/portals/7/docs/airportEconomicImpactSummary.pdf.

10 *Ibid*.

11 Multiplier effects refer to the recirculation of money in the local economy after initially being spent by the Airport, its tenants, or tourists. This recirculation increases the overall impact of the Airport's operation in the local economy.

12 MassDOT Aeronautics Division. 2019. *Massachusetts Statewide Airport Economic Impact Study Update.* https://www.mass.gov/files/documents/2019/03/25/AeroEcon_ImpactStudy_January2019.pdf.

13 Massport, 2019. *Massachusetts Port Authority 2019 Comprehensive Annual Financial Report*. http://www.massport.com/media/3425/mpa-fy19-cafr-final.pdf. Table S-11.

Logan Airport is considered an origin and destination (O&D)[14] airport both nationally and internationally, meaning that approximately 90 percent of Logan Airport passengers' trips either start or end at Logan Airport. Hub airports, such as Atlanta or Chicago, serve many more passengers annually but, compared to O&D airports like Logan Airport, a higher percentage of passenger traffic at hub airports passes through to connecting flights. Through 2019, Logan Airport was one of the fastest growing large airports in the United States in terms of passenger volume.[15] From 2017 to 2019, U.S. air passenger traffic grew by 9.1 percent, whereas Logan Airport experienced a passenger growth of 10.7 percent over the same time period.[16] Logan Airport is considered a domestic and international origin and destination (O&D) airport, meaning that less than 10 percent of air passengers are connecting through Logan Airport.

Forecast Status

The *2017 ESPR* presented an updated forecast for Logan Airport aircraft operations and passenger activity. That forecast focused on a Future Planning Horizon including a projected 50 million annual air passengers and 486,000 annual aircraft operations. Massport's ESPR forecast was consistent with the Federal Aviation Administration's (FAA's) Terminal Area Forecast at that time. However, the COVID-19 pandemic has dramatically reduced air passenger traffic and it's currently expected that it will take several years for the industry to return to pre-COVID-19 operational levels.

During 2018 and 2019, due to the strong economy, passenger activity levels and aircraft operations at Logan Airport increased rapidly. This growth trend was upended in March 2020 and accordingly, the *2017 ESPR* projections will need to be adjusted as the longer-term impacts of the COVID-19 pandemic are better understood.

Massport Investment in Logan Airport

Massport evaluates and implements enhancements to Logan Airport's safety, security, operational efficiency, and accessibility to and from the Boston metropolitan area, while carefully monitoring the environmental effects of Logan Airport operations. A continuing focus has been on enhancing the passenger and user experience at Logan Airport. Recent and ongoing terminal area projects are aimed at providing seamless post-security connectivity among the terminals along with enhancements to passenger processing through consolidated security checking areas. Access to and around Logan Airport also remains a priority. Massport continues to work with FAA to enhance airside safety through a variety of runway safety area (RSA) improvements and simplification of the airfield geometry.

As noted above, the impacts of the COVID-19 pandemic have precipitated a wide range of changes at Logan Airport. Both the drop in passengers and associated revenues have required significant

14 "Origin and destination" traffic refers to the passenger traffic that either originates or ends at a particular airport or market. A strong O&D market like Boston generates significant local passenger demand, with many passengers starting their journey and ending their journey in that market. O&D traffic is distinct from connecting traffic, which refers to the passenger traffic that does not originate or end at the airport but merely connects through the airport en route to another destination.

15 Between 2014 and 2019, Logan Airport was the 20th fastest growing airport in the U.S. in terms of domestic O&D traffic compared to the top 30 large hub U.S. airports (U.S. DOT O&D Survey).

16 ACI. 2019. ACI North American Airport Traffic Summary. http://www.aci-na.org/content/airport-traffic-reports.

adjustments to services and project schedules. Massport has focused on adjusting services to match the shifting passenger levels and ensure that those changes are made with careful consideration of managing environmental and operating impacts. In some areas, programs have been adjusted to reflect current needs and impacts. Massport remains committed to implementing project-related mitigation strategies, as documented in Chapter 9, *Environmentally Beneficial Measures and Project Mitigation Tracking*.

2018 and 2019 Highlights and Key Findings

This section provides a brief overview of key findings, by chapter, at Logan Airport in 2018 and 2019. A brief update on 2020 activity and future projections is also included in light of the COVID-19 pandemic. Additional information concerning Airport activities is provided in subsequent chapters. This section also highlights Massport's efforts to further sustainability through specific projects and initiatives with a sustainability leaf and summarizes Massport's sustainability program.

The Secretary's Certificate on the *2017 ESPR*, which forms the Scope of this *2018/2019 EDR*, acknowledged the rapid growth in the past several years and directed Massport to provide updates on the *2017 ESPR* forecast. While Logan Airport's recent rapid passenger growth continued through early 2020, the COVID-19 pandemic began to dramatically reduce airport operations and passengers in mid-March 2020. In the early phases of the pandemic, passenger levels dropped by over 90 percent. While activity levels began a slow recovery in mid-summer 2020, the ongoing wave of COVID-19 cases has resulted in continued historically low levels of activity, with a full recovery years away. As of October 2020, total flight operations for the year were down by 50 percent and passenger levels were down by about 70 percent compared to January through October 2019. Massport expects that by the end of 2020, passenger levels will have dropped to levels of activity not seen since the mid-1970s. Until the longer-term impacts of COVID-19 are better understood, Massport can only make preliminary projections of the rate of recovery for passenger levels. The next EDR will provide further updates using best available information at that time.

Activity Levels

Until the onset of the COVID-19 pandemic, Logan Airport (and the aviation industry in general) had been experiencing strong growth, largely driven by the positive economic conditions in the Boston region, low unemployment, a strong, diverse economic base, and continued investment in commercial and residential real estate, particularly in life sciences, finance, healthcare, and higher education. Due to the COVID-19 pandemic, 2020 passenger levels and operations have dramatically decreased. As of October 2020, year-over-year passenger levels and operations are down by approximately 70 percent and 50 percent, respectively.

Air passenger activity levels at Logan Airport in 2018 and 2019 increased to 40.9 million in 2018 and 42.5 million in 2019. Aircraft operations continued the long-term trend of increasing at a slower rate than passengers. In 2018, operations totaled 424,024 and 2019 operations totaled 427,176. That growth was directly correlated to the strong national and regional economy. Even with the strong growth, aircraft operations remained well below the 487,996 operations in 2000 and the historic peak of

507,449 operations reached in 1998. The combination of fewer operations in cleaner and quieter aircraft has resulted in dramatically reduced environmental impacts when compared with those historical peaks.

From 2010 to 2019, the annual number of passengers at Logan Airport increased by about 55 percent, while the annual number of aircraft operations[17] increased at a slower rate, about 21 percent, due to increasing aircraft load factors. International passenger levels increased at a faster rate than domestic passenger levels in 2018 and 2019. Domestic air passenger activity levels increased by 6.9 and 2.6 percent in 2018 and 2019, respectively, while international air passenger activity levels increased by 5.3 and 9.7 percent, respectively.

Please see Chapter 2, *Activity Levels,* for additional information.

Airport Planning

Massport is continually improving the facilities at Logan Airport to accommodate changes in passenger demand, aircraft activity, cargo needs, and transportation access. In Chapter 3, *Airport Planning*, Massport has identified priority planning projects and initiatives in the following categories:

- Ground Transportation and Parking;
- Terminals;
- Airside Planning;
- Service Areas;
- Airport Buffers and Open Space; and
- Energy, Sustainability, and Resiliency.

During 2018 and 2019 there was a strong focus on ground access and trip reduction measures and terminal improvements. Recent and ongoing terminal area projects are providing seamless post-security connectivity and flexibility among the terminals along with enhancements to passenger processing through consolidated security checking areas.

To enhance the on-Airport roadway network, Massport is improving several of the terminal area roadway segments and intersections. In October 2019, Massport opened its new RideApp consolidated drop-off and pick-up areas in the Central Garage. In 2018 and 2019, Massport also advanced several high-occupancy vehicle (HOV) services and Logan Express facilities improvements as part of its trip-reduction goals.

17 An aircraft operation is defined as one arrival or one departure.

Since filing the *2017 ESPR*, Massport has completed state and/or federal environmental review of several projects:

- The Logan Airport Parking Project, which will add 5,000 commercial parking spaces at Logan Airport in locations already in use for parking. The additional parking spaces respond to the MassDOT and U.S. Environmental Protection Agency (EPA)'s approval of a modification to the regulatory Logan Airport Parking Freeze.[18] The additional spaces are intended to reduce environmentally harmful drop-off/pick-up modes (i.e., dropped off or picked up by private vehicles, taxi, RideApp, or black car limousine service). The joint MEPA/NEPA review process was completed in January 2020. This project is currently deferred due to the reduction in passenger activity associated with the COVID-19 pandemic.
- Terminal C Canopy, Connector and Roadway Project received federal environmental approval under NEPA in November 2018. As described in the *2017 ESPR*, construction of this project will replace and reconfigure sections of the elevated roadways connecting Terminals B and C. At this time, construction of the replacement canopy is anticipated to begin and be completed in 2021, with a slightly reduced program than originally planned. The Terminal B to C Connector is anticipated to be complete in spring 2022 and roadways are anticipated to be complete in 2023.

Massport continues to work with FAA to enhance airside safety through a variety of federal Runway Safety Area projects and simplification of the airfield geometry. Please see Chapter 3, *Airport Planning,* for additional information.

Regional Transportation

In 2018 and 2019, the New England region saw an increase in air passenger activity. Regional air passengers increased by 6.5 percent to 58.3 million air passengers in 2018 and then another 2.5 percent to 59.7 million in 2019. The 10 regional airports (excluding Logan Airport) in New England accommodated 17.3 and 17.2 million air passengers in 2018 and 2019, respectively, compared to 16.3 million passengers in 2017.

Worcester Regional Airport, T.F. Green Airport, Portland International Jetport, Burlington International Airport, and Bangor International Airport saw an overall increase in commercial service operations since 2017. Manchester-Boston Regional, Tweed-New Haven, Bradley International, and Portsmouth International airports saw reduced service offerings since 2017.

Massport's three airports, Logan Airport, Worcester Regional Airport, and Hanscom Field, make significant contributions to the regional economy, generating approximately $23.1 billion annually, or 94 percent of the overall economic benefits generated by the Massachusetts airport system. Hanscom Field is a reliever airport to Logan Airport and is the second busiest airport in New England.

Worcester Regional Airport passenger numbers increased by 76 percent in 2019 compared to 2017 and reported a total of 817,057 passengers from 2013 to 2019. In the past five years, Worcester Regional Airport experienced an average growth rate of 10 percent per year. Massport continues to invest in

18 310 Code of Massachusetts Regulations 7.30 and 40 Code of Federal Regulations 52.1120.

Worcester Regional Airport—together with the City of Worcester, Massport has already initiated a $100 million, 10-year investment to revitalize and attract commercial operations to Worcester Regional Airport. Investments include a CAT III Instrument Landing System (about $32 million) paid for by federal grants and Massport funds. Additionally, jetBlue Airways, American Airlines, and Delta Air Lines announced new service to New York John F. Kennedy International Airport (JFK), Philadelphia International Airport, and Detroit Metropolitan Wayne County Airport, respectively. As of the publication date of this EDR, commercial passenger service out of Worcester Regional Airport has been suspended by the airlines due to a drop in passenger demand as a result of the COVID-19 pandemic.

Amtrak rail system-wide ridership increased from 31.7 million customer trips in fiscal year (FY) 2018 to 32.5 million trips in FY 2019. In FY 2018, the Northeast Corridor (NEC) carried over 12 million passengers, up about 1 percent from the prior year. In FY 2019, the NEC carried 12.5 million passengers on those services, up about 3 percent from the prior year.

Ground Access

Logan Airport continues to be one of the top airports in the United States in terms of HOV and transit mode share. Massport promotes numerous HOV, transit, and shared-ride options to improve on Airport roadway and curbside operations, alleviate constraints on parking, and improve customer service. Key findings from 2018 and 2019 are summarized in the bullets that follow and additional details can be found in Chapter 5, *Ground Access to and from Logan Airport*.

- Average weekday on-Airport vehicle miles traveled (VMT) increased by about 4.5 percent from 2017 to 2018. Between 2018 and 2019, average weekday on-Airport VMT increased by 2.2 percent. The change in average daily traffic can be attributed primarily to the increases in air passenger activity, passenger drop-off/pick-up, cargo, and non-aviation related Airport uses. It is anticipated that the Airport activity and on-Airport VMT will be significantly lower in 2020 due to the impact of COVID-19.
- RideApp transactions totaled more than 7 million in 2018 and increased to over 8 million in 2019, a growth of over 16 percent. RideApps are impacting other access modes to the Airport and contributing to on-Airport congestion. Partially due to the continued rise of RideApps, black car limousines and scheduled van ridership dropped by nearly 23 percent from 2017 to 2019. Taxi dispatches declined 14 percent in 2018 compared to 2017 and 7 percent between 2018 and 2019. The Massachusetts Bay Transportation Authority (MBTA) Blue Line ridership increased by 4 percent between 2017 and 2018 and declined by 29 percent the following year.
- Based on changes in passenger mode choice for accessing Logan Airport observed between 2017 and 2019, Massport updated its goals and definition of HOV. The updated definition considers vehicle occupancies of taxis, black car limousines, and RideApps that carry two or more air passenger per vehicle to be HOV, while the same modes with one air passenger will count as non-HOV. With this updated definition, Massport established a goal of 35.5 percent HOV by 2022 and 40 percent by 2027. Based on the results of the 2019 Air Passenger Ground-Access Survey, HOV mode share has reached 40.4 percent, exceeding both near-term and longer-term goals. While it's anticipated that the HOV mode share will drop as a result of COVID-19 over the short term, Massport expects HOV ridership to recover over time and remains committed to the HOV mode share goals going forward.

Ground Access Strategy

Massport has a long-standing multi-pronged, trip reduction strategy to diversify and enhance ground transportation options for passengers and employees traveling to and from Logan Airport. The strategy is designed to offer passengers a choice of HOV, transit, and shared-ride options that are convenient and reliable, and that reduce environmental and community impacts. For many years, Logan Airport has ranked as one of the top U.S. airports in terms of HOV and transit mode share. Massport promotes numerous HOV, transit, and shared-ride options to improve on Airport roadway and curbside operations, alleviate constraints on parking, and improve customer service.

Massport's strategy also aims to provide sufficient on-Airport parking for air passengers choosing automobile access modes and/or who have limited HOV options. In 2017, the MassDEP amended the Logan Airport Parking Freeze to allow for an increase of up to 5,000 on-Airport commercial parking spaces, which allows for the construction of additional parking to reduce the use of drop-off/pick up modes and alleviate constrained on-Airport parking conditions.

A long-standing Massport interest is addressing on-Airport roadway congestion with a combination of policy changes and infrastructure improvements. Alleviating terminal area congestion is important for continued safe and efficient landside operations and to reduce environmental impacts. Enhancing multimodal transportation options and providing modern, flexible infrastructure is one way an airport can reduce greenhouse gas (GHG) emissions and improve its environmental footprint.

Massport recognizes the importance of providing safe and reliable HOV services to and from the Airport and by 2019 had already reached its strategic plan to increase HOV mode share to 40 percent by 2027. Understanding the growth in RideApp use and their impact on regional and terminal area roadway congestion is essential to managing on-Airport traffic volume and promoting HOV services as a viable and attractive alternative. Potential emissions reductions are one reason why Massport is committed to a long-term goal of promoting and supporting public and private HOV and shared-ride services aimed at serving air passengers, Airport users, and employees. Other benefits include:

- Reducing congestion on the terminal roadways and curbside drop-off/pick-up areas;
- Alleviating constraints on limited parking facilities; and
- Customer service (providing a range of transportation options for different traveler demographics).

While this report focuses primarily on activity in 2018 and 2019, as a result of the COVID-19 pandemic, a number of Massport's broad HOV and trip reduction measures temporarily changed in 2020. Flights in and out of Logan Airport have been dramatically reduced and passenger levels dropped by nearly 90 percent beginning in March 2020. As a result, while operational and passenger levels have recovered somewhat as of mid-2020, overall, there are far fewer passengers and employees traveling to and from Logan Airport and there is far less peak period roadway congestion both in Boston and the metropolitan area. In addition, the public's interest in using HOV transportation services like buses, rapid transit, and commuter rail has been significantly affected by public health concerns related to COVID-19.

Within that context, Massport continues to evaluate and plan for the recovery of air passenger activity and remains committed to implementing the broad range of ground access strategies that were outlined in

the *2017 ESPR* as demand for those measures recovers. The schedule for those services and planned improvements has, however, been adjusted due to the continuing operational constraints and revenue reductions. Massport continues to carefully review both on and off-Airport activity levels and will adjust its ground access programs to align with ridership levels. Future EDRs will provide detailed updates on all service adjustments and activity levels.

Massport continuously evaluates it strategies and programs aimed at improving and, where needed, expanding HOV services to and from Logan Airport, including continued investment in Logan Express facilities and service. The initiatives described below can improve roadway operations as well as air quality emissions. The following measures have been implemented or remain under consideration:

- A goal to double Logan Express ridership by the time Logan Airport reaches 50 million air passengers by expanding parking, frequency, and facility upgrades;
- **Suburban Logan Express Service Enhancements**
  - In 2019, Massport increased total Logan Express seat capacity by over 10 percent.
  - Increase Braintree Logan Express service from two to three trips per hour (implemented in May 2019 but reduced to hourly service in March 2020 due to the impacts of COVID-19).
  - Add about 1,000 additional spaces to the Framingham garage (permitting completed in 2020 however construction is deferred).
  - Provide security line priority status to Logan Express Back Bay riders (implemented in 2019; this service is temporarily suspended due to COVID-19).
  - Marketing to support Logan Express strategy and increase ridership.
  - Implement Logan Express electronic ticketing (pending).
  - Evaluate new Logan Express suburban locations, with a plan to open at least one new site (deferred due to COVID-19).
  - Explore RideApp Last Mile connections.[19]
  - Continue to monitor parking capacity at all Logan Express sites.
- **MBTA Silver Line**
  - Eight MBTA Silver Line buses were purchased in 2005 by Massport and are operated by the MBTA, with Massport paying operating costs. Since the existing Silver Line fleet is reaching the end of its useable life, the MBTA and Massport have been working together on a plan to procure a replacement Silver Line fleet. As part of this initiative, Massport and the MBTA developed a Silver Line Capacity Study to determine the mid-term fleet and facility needs as well as to assess other ways to improve the reliability and capacity of the system. Based on this analysis, the MBTA plans to procure 45 new enhanced electric hybrid vehicles to replace the existing fleet of 32 dual mode vehicles. Massport plans to purchase eight MBTA Silver Line buses as part of a forthcoming MBTA procurement.

19 Individuals who fall within the 0.5-mile to 1-mile drive distance of a Logan Express facility are the most likely group to use TNCs to connect between the facility and their home.

- **Urban Logan Express Service**
  - Change pick-up/drop-off location from Copley to Back Bay Station (Implemented in 2019. This service is temporarily suspended due to COVID-19).
  - Discount one-way fare from $7.50 to $3.00 (implemented in 2019).
  - Provide free service from Logan Airport (implemented in early 2019).
  - Pilot priority security line status for riders (implemented in 2019).
  - Marketing to support increased ridership (ongoing).
  - Implement Logan Express electronic ticketing (pending).
  - Implement a second urban Logan Express service at North Station (although Massport procured buses for this service in 2020, due to COVID-19, this new service has been deferred).
- **RideApp Management Plan**
  - Facilitate rematch and shared ride by moving RideApp drop-off/pick-up activity to new dedicated areas in the Central Garage (complete).
  - Implement RideApp rematch[20] so drivers dropping off can more easily leave with a passenger (complete).
  - Introduce RideApp shared ride incentives to reduce RideApp vehicles through gateways by increasing vehicle occupancies (complete).
  - Adopt new RideApp fee structure to support HOV strategies, encourage shared rides, and reduce gateway congestion (complete).
  - Optimize RideApp operations on-Airport through data reporting, enforcement tools, and emerging RideApp products (continuing).
- **Infrastructure improvements**
  - Massport will continue to evaluate and identify the need for additional infrastructure modifications as a complement to policy changes to allow terminal area roadways and curbsides to continue functioning adequately and minimize vehicle idling and associated emissions. Changes will be implemented as needed.

20 Rematch allows drivers who are dropping off to instantly pick up another passenger without needing to circle the Airport or leave empty.

Noise

Massport strives to minimize the noise effects of Logan Airport operations on its neighbors through a variety of noise abatement programs, procedures, studies, and other tools. At Logan Airport, Massport implements one of the oldest and most extensive noise abatement programs of any airport in the nation. Massport's comprehensive noise abatement program includes a dedicated Noise Abatement Office; a state-of-the-art Noise and Operations Monitoring System (NOMS); extensive residential and school sound insulation programs; time-of-day and runway restrictions for noisier aircraft; ground run-up procedures; and flight tracks designed to optimize over-water operations (especially during nighttime hours). The public can register noise complaints by phone or online through Massport's website.[21]

Key findings are summarized in the bullets that follow and additional details can be found in Chapter 6, *Noise Abatement*.

- The fleet mix of Logan Airport continues to be composed of aircraft types with the quietest available technology (Stage 5 is the quietest). About 15 percent of 2018 and 2019 operations were conducted in aircraft meeting Stage 5 requirements, 83 percent meeting Stage 4 requirements, and 2 percent in Certified Stage 3. While the shift to an all-Stage-4-and-5 fleet has been gradual, the accelerated retirements of older aircraft in 2020 are likely to increase the share of Stage 5 in the Logan Airport fleet. The retirement of older, noisier aircraft has been accelerated by the COVID-19 pandemic where airlines continue to phase out older aircraft in response to reduced passenger loads beginning in spring 2020. The *2020 EDR* will provide an update on this emerging trend.
- Massport and FAA continue to work with the Massachusetts Institute of Technology (MIT) to investigate opportunities to reduce noise through changes to performance-based navigation (PBN), including RNAV. This cooperation is a first-in-the-nation project between FAA and an airport operator to better understand the implications of PBN and evaluate strategies to address community concerns.
- Massport continues to be a national leader in sound insulation mitigation. To date, Massport has provided sound insulation for a total of 36 schools and 11,515 residential units and will continue to seek funding for mitigation for properties that are eligible and whose owners have chosen to participate. Since the start of the program, over $170 million has been invested. In 2019, Massport updated its Residential Sound Insulation Program (RSIP) Noise Exposure Map contours and submitted an Aviation Environmental Design Tool (AEDT)-derived noise exposure map to the FAA in 2020 for review and discussion.
- Massport is currently working with FAA to possibly address issue with the first-generation sound insulation windows. In January 2020, Massport's CEO sent a letter to the FAA Associate Administrator requesting that Massport and FAA work together to address re-treatment of homes that were sound insulated during the early years of the program to upgrade eligible homes to newer, more effective and durable materials. The Associate Administrator responded that FAA is exploring limited circumstances under which Massport might be able to mitigate homes that had been mitigated before FAA first issued sound insulation standards in 1993. The status of the initiative will be reported in future EDRs. Please see Appendix H, *Noise Abatement* for additional info.

21 Massport. Noise Complaints. http://www.massport.com/logan-airport/about-logan/noise-abatement/complaints/.

- Nighttime operations represented 16.1 percent and 16.6 percent of total operations in 2018 and 2019, respectively. Nighttime operations increased, from an average of 168 per night in 2017 to 187 per night in 2018 and 195 per night in 2019. The main increases to nighttime commercial activity were in passenger aircraft operations, primarily resulting from the overall growth in domestic air carrier flights and increased flights to international destinations. The majority (about 81 percent) of nighttime operations occurred either before midnight or after 5:00 AM.
- There was an overall decrease in the total number of people residing within the Day-Night Average Sound Level (DNL) 65 decibel (dB) contour from 2017 to 2018. However, the number within the DNL 65 dB contour increased in Winthrop and Revere while decreasing in East Boston. From 2017 to 2018, there was an increase in total operations and in nighttime operations, but the primary factor in the DNL contour changes was a shift in 2018 back to typical runway use following the extended Runway 4L-22R closure in 2017.
- The 2019 DNL contours are similar in shape and size to those for 2018, with small changes due to runway use shifts, increases in nighttime operations, and overall operations growth in 2019. The total number of people residing within the DNL 65 dB contour increased from 7,034 in 2018 to 8,768 in 2019. The additional population within the DNL 65 dB contour is mainly located in East Boston, primarily due to an increase in Runway 33L departures due to an increase in northwest winds in 2019.
- Compared to 1990, the total number of people residing in the DNL 65 dB contour is about 84 percent lower and 80 percent lower in 2018 and 2019, respectively, due to improved engine technology.

Noise Strategy

The foundation of Massport's noise program is the *Logan Airport Noise Abatement Rules and Regulations*[22] (Noise Rules), which have been in effect since 1986. Massport's Noise Abatement Office is responsible for implementing noise abatement measures and generally monitoring community complaints and other aspects of the noise effects from Logan Airport operations.

Image of Vortex Generator Device by Port on Wing.

Massport is focused on the following noise abatement initiatives:

- **Partnerships with Airlines and FAA**
  - Massport is encouraging retrofitting the Airbus A319/320/321 family of aircraft with vortex generators, which reduce tonal noise on approach. In October 2018, jetBlue Airways (the air carrier with the greatest number of operations at Logan Airport) announced plans to retrofit its older Airbus fleet with Vortex Generators. This move reflects the partnership between Massport and the airlines to reduce aircraft noise to benefit surrounding communities. As airlines retrofit aircraft and transition to the newer models of the A320 family, the number of aircraft operating at Logan Airport without the vortex generators is expected to decrease. For more information, please refer to a press release discussing the generators in Chapter 6, *Noise Abatement*.

22 The Logan International Airport Noise Abatement Rules and Regulations, effective July 1, 1986, are codified as 740 Code of Massachusetts Regulations (CMR) 24.00 et seq (also known as the Noise Rules).

- On October 7, 2016, Massport and FAA signed a Memorandum of Understanding (MOU)[23] to frame the process for analyzing opportunities to reduce noise through changes or amendments to performance-based navigation (PBN), including area navigation (RNAV). This cooperation is a first-in-the-nation project between FAA and an airport operator to better understand the implications of PBN and evaluate strategies to address community concerns. MIT is the technical lead. Block 1 was completed in late 2017 and recommendations were made to the FAA. Currently, MIT is conducting the analysis for Block 2.
  - The fleet operating at Logan Airport is comprised of 83 percent Stage 4 aircraft and 15 percent Stage 5 aircraft (Stage 5 being the quietest), well above the FAA minimum Stage 3 engines.
  - Massport continues to prohibit the use of Runways 4L for departures and Runway 22R for arrivals from 11:00 PM to 6:00 AM; maximize late-night over-water operations via Runways 15R and 33L; and restrict nighttime engine run-ups and use of auxiliary power units (APUs).
  - Massport continues to encourage the voluntary use of reduced-engine taxiing when appropriate and safe (see Appendix L, *Reduced/Single Engine Taxiing at Logan Airport Memoranda*).
  - Massport continues improvement of the Noise Monitoring System. Massport went out to bid in 2018 and selected the prior vendor in 2019. Upgrades to the system and some noise monitors have begun.

- **Sound Insulation Program**
  - Massport has one of the most extensive residential and school sound insulation programs in the nation. To date, Massport has installed sound insulation in 5,467 residences, including 11,515 dwelling units, and 36 schools in East Boston, Roxbury, Dorchester, Winthrop, Revere, Chelsea, and South Boston. Since the start of the program, over $170 million has been invested.
  - Approximately 8 percent of applicants also choose the Room-of-Preference option that allows the owner to identify a room (usually a bedroom or living room) for extra acoustical treatment.

23 Massport. October 7, 2016. *Massport and FAA Work to Reduce Overflight Noise.* https://www.massport.com/news-room/news/massport-and-faa-work-to-reduce-overflight-noise/.

Air Quality/Emissions Reduction

Total emissions from all sources associated with Logan Airport are less than they were a decade ago, with the exception of NO_x. This long-term downward trend is consistent with Massport's longstanding objective to accommodate the demands of increasing passenger and cargo activity levels with fewer aircraft operations and reduced emissions wherever possible. When compared to 2017, the changes in air emissions in 2018 and 2019 remain within expected values given the corresponding upturn in aircraft operations. Due to the COVID-19 pandemic, there are far fewer aircraft operations, passengers, and overall activity at Logan Airport. Reductions in aircraft operations and ground access trips will likely result in reduced emissions in 2020.

Massport prepared emissions inventories for 2018 and 2019 for the criteria pollutants carbon monoxide (CO), particulate matter (PM_{10}/$PM_{2.5}$), and volatile organic compounds (VOCs), as well greenhouse gases (GHGs) and oxides of nitrogen (NO_x). Key findings of those emissions inventories include:

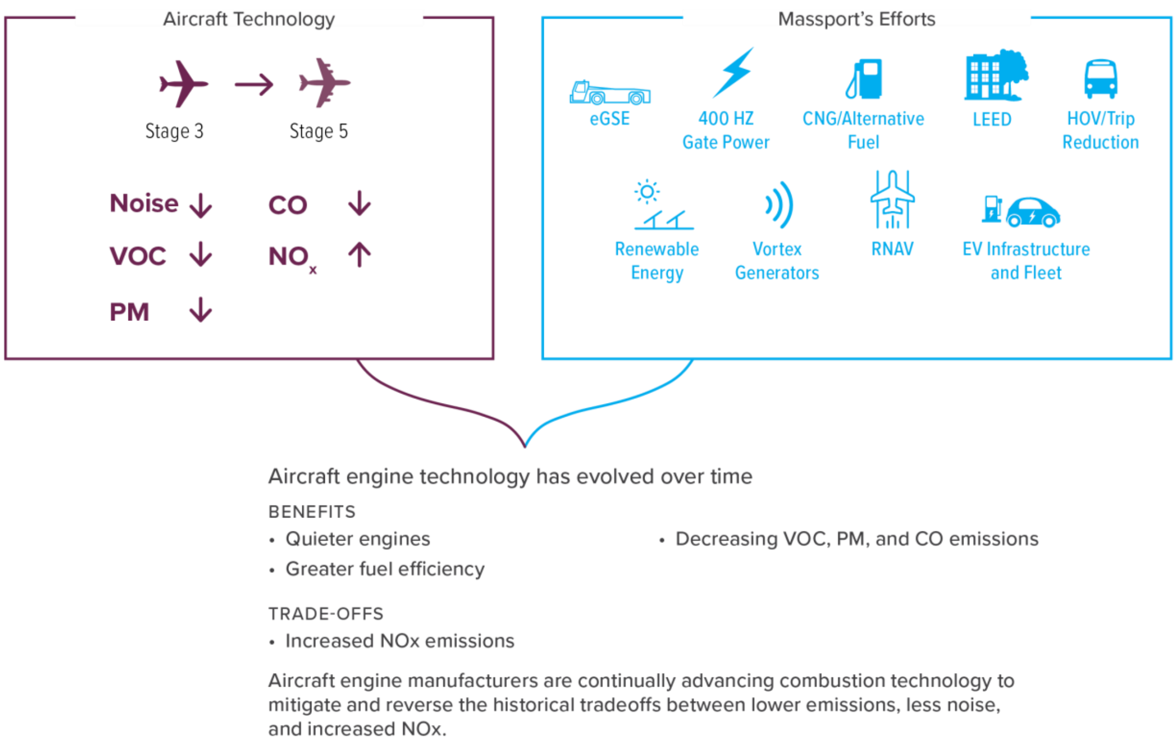
- Total modeled emissions of CO, PM_{10}/$PM_{2.5}$ and NO_X, increased from 2017 to 2018 by approximately 14 percent, 17 percent, and 4 percent, respectively. VOCs remained consistent. These increases were mainly attributable to the 5.6-percent increase in aircraft operations in 2018 compared to 2017. Variations in emissions were also due to airframe/engine combination parameters included in the two model versions used and the associated differences in applied emission factors assumed in the models.
- In 2019, total modeled emissions of CO, PM_{10}/$PM_{2.5}$, and VOCs each increased by about 2 percent from 2018. NO_X emissions instead increased by about 5 percent. These changes are also due to an increase in aircraft operations of 0.7 percent as well as slight variations in the aircraft fleet mix from 2018 to 2019. Additionally, increases in NO_X emissions in 2019 are associated with higher stationary source fuel usages in that year.
- Modeled emissions of CO, VOC, and NO_X associated with GSE and motor vehicles, many of which Massport has influence, have declined from 2018 to 2019. Emissions of PM_{10}/$PM_{2.5}$ remain steady. While there are model version differences between 2017 and 2018, causing variances in emissions between those years, overall GSE and motor vehicles show a decreasing trend from 2017 to 2019 for all pollutants.
- Total Logan Airport GHG emissions increased from 2017 to 2018 by approximately 10 percent and from 2018 to 2019 by approximately 4 percent. These increases are primarily due to the increase in aircraft operations (i.e., 5.6 percent in 2018 and 0.7 percent in 2019). GHG emissions associated with Logan Airport in 2018 and 2019 are approximately 1 percent of the most recent statewide emissions estimates.

Effect of Aircraft Engine Technology on NO_x

Aircraft emissions continue to represent the largest source (95 percent) of NO_x at Logan Airport, followed by other sources (2 percent), ground service equipment (GSE) (2 percent), and motor vehicles (1 percent). Massport does not have any control over aircraft emissions, which represent the vast majority of total airport emissions.

To reduce fuel use and emissions, aircraft engine designers and manufacturers continue to work on producing more "fuel-efficient" (i.e., less fuel-burning) engines. This is achieved by enhancing engine performance with improved fuel combustion technologies, greater thrust-generating power, and less engine wear. Aircraft are also being designed to decrease fuel-burn with advancements in aircraft wing and body aerodynamics, light-weight alloy materials, and improved means of navigation. These emerging technologies and reduced fuel burn are expected to reduce emissions, reduce noise, and moderate the growth in NO_x emissions into the future.

Figure 1-8 Aircraft Engine Technology Has Evolved Over Time



Air Quality Strategy

Massport's air quality management strategy for Logan Airport focuses on decreasing emissions from Airport-related sources. Since Massport does not have direct control over aircraft operations or fleet choices of the airlines, it continues to focus on areas that Massport does control or has an opportunity to influence. Massport's air quality management strategy for Logan Airport focuses on decreasing emissions from Airport-related sources, in addition to furthering innovative means to achieve emissions reductions Airport-wide. Massport has established a number of goals and objectives to address air emissions from Airport operations, including the reduction of GSE and Massport vehicle fleet emissions. Massport is focused on the following initiatives:

- **Provide infrastructure and encourage practices that support reductions in aircraft emissions**
    - Massport provides pre-conditioned air (PCA) and 400 Hertz (Hz) power at all aircraft contact gates to reduce aircraft idling and use of APUs.
    - Massport encourages single engine taxiing procedures by the airlines when safe, to reduce both noise and air emissions.
    - Use of battery powered tugs and belt loaders for the Delta Air Lines ground service fleet at Terminal A. Massport is advancing plans to extend the infrastructure for plug-in GSE to other locations.
- **Maximize use of HOV and reduce single occupancy vehicle trips, particularly drop-off/pick-up trips, and passenger use of private vehicles to and from the Airport**
    - Massport implements an extensive HOV strategy and ground transportation improvements (see following section, Ground Access Strategy, for details).
- **Reduce emissions from fleets operating at Logan Airport**
    - Massport is facilitating the replacement of gas- and diesel-powered GSE with all-electric GSE (eGSE) by the end of 2027 (as commercially available). In 2018, EPA awarded a grant to Massport to replace gas- and diesel-powered GSE at Logan Airport. This grant will be used in conjunction with an FAA VALE grant Massport received in the fall of 2018 to install eGSE charging stations as part of the Terminal B Optimization Project. In 2019, through the same program, Massport was awarded funds for jetBlue Airways' charging infrastructure at Terminal C, Massport contributed toward the installation of 42 eGSE charging stations.
    - In 2019, Massport was awarded a grant through the Massachusetts Department of Environmental Protection's (MassDEP's) Volkswagen Diesel Settlements & Environmental Mitigation Open Solicitation grant program, aimed at reducing NO_X and GHG emissions, to acquire eGSE in partnership with jetBlue. This will replace 31 pieces of GSE with new eGSE and install four eGSE charging stations at Terminal C. United Airlines also privately pursued this grant and was awarded funding.
    - Additionally, in 2019 EPA awarded Massport a DERA grant to replace 44 diesel-powered GSE equipment with all-electric baggage tractors, belt loaders, and push back tugs. GSE owners at Logan Airport will contribute a match.

- **Provide infrastructure to support alternative fuels including compressed natural gas (CNG) and electricity**
    - Massport continues to operate one of New England's largest retail CNG stations, which is open to the public. In 2018 and 2019, the CNG station pumped approximately 25,750 and 24,445 gasoline-gallon equivalents per month for all Massport fleet vehicles (non-Massport vehicles were also using CNG).
    - Massport supports the current and future standard systems for plug-in electric vehicles (EVs). Massport has installed 13 EV-charging stations to accommodate a total of 26 vehicles in the Central Garage and Terminal B parking areas. Massport has increased the availability of EV charging stations so that 150 percent of this demand is available at all facilities at all times and will continue to evaluate demand as passenger activity levels return. Currently, there are 123 charging ports installed at Logan Airport and more at the Logan Express sites.
- **Reduce emissions from Massport fleet vehicles**
    - Massport continues to run and augment its fleet of 54 alternative fuel vehicle (AFV)/alternative power vehicle (APV) on-Airport shuttle buses. Massport also has a vehicle procurement policy that requires consideration of AFVs when purchases are made.
- **Reduce emissions associated with Massport buildings, including energy needs**
    - Massport has committed to achieving Leadership in Energy and Environmental Design (LEED®) certification for eligible buildings, as appropriate.
    - Massport continues to invest in renewable energy installations on-Airport (solar/wind).

Environmental Compliance and Management/Water Quality

Massport's approach to environmental management and compliance is a key component of its commitment to sustainability and responsible stewardship at Logan Airport. Through monitoring and documentation, Massport assesses environmental performance, continually developing, implementing, evaluating, and improving policies and programs. Massport promotes appropriate environmental practices through pollution prevention and remediation measures. Massport also works closely with tenants and operations staff at Logan Airport in an effort to continuously improve environmental compliance. Key findings in this EDR include:

- In 2018, approximately 97 percent of Massport's stormwater samples were in compliance with National Pollutant Discharge Elimination System (NPDES) permit requirements and in 2019, approximately 99 percent of samples were in compliance.
- Massport has had its International Organization for Standardization (ISO) 14001 Environmental Management System (EMS) in place since 2006.
- Massport annually updates and maintains its Stormwater Pollution Prevention Plan (SWPPP) for Logan Airport.

- Massport continues to assess, remediate, and bring its Massachusetts Contingency Plan sites to regulatory closure.
- In 2018, there were eight reportable spills, similar to 2017. Six storm drains were impacted, an increase from the two in 2017. In 2019, there were 22 reportable spills of which nine storm drains were impacted.

For additional information, please see Chapter 8, *Environmental Compliance and Management/Water Quality*.

Sustainability and Resiliency Program

Massport is committed to a robust sustainability program. Sustainability has redefined the values and criteria for measuring organizational success by using a "triple bottom line" approach that considers economic, ecological, and social well-being. Applying this approach to decision-making is a practical way to optimize economic, environmental, and social capital. Massport is taking a broad view of sustainability that builds upon the triple bottom line concept and considers the airport-specific context. Consistent with the Airports Council International - North America's (ACI-NA) definition of Airport Sustainability,[24] Massport is focused on a holistic approach to managing Logan Airport to ensure Economic viability, Operational efficiency, Natural resource conservation, and Social responsibility (EONS). Massport is committed to implementing environmentally sustainable practices Airport- and Authority-wide and continues to make progress on a range of initiatives. The following sections summarize many of the long-term and multifaceted sustainability initiatives undertaken by Massport, which individual chapters of this *2018/2019 EDR* more fully describe, where appropriate. **Figure 1-9** highlights some of Massport's recent sustainability initiatives.

Figure 1-9 Recent Sustainability Highlights

- Five LEED (Leadership in Energy and Environmental Design) Certified Facilities at Logan Airport
- Sustainability Management Plan and Annual Reporting
- Sustainable Design Standards and Guidelines
- Climate Change and Resiliency Planning – 100% of Critical Assets Enhanced
- Rooftop Solar at Economy Garage, Rental Car Center, Green Bus Depot, Terminal B Garage, Terminal A, and Logan Office Center
- Alternative Fuel Vehicle (AFV) Program – Converting Tenant and Massport Fleets to Compressed Natural Gas (CNG) or Electricity
- Conversion of Gas- and Diesel-Powered Ground Service Equipment (GSE) to Electric Versions
- Commitment to Community Park and Open Space – Over 33 Acres of Green Space in East Boston
- Developing recommendations from "Sustainable Massport 2.0" stakeholder engagement

24 Airports Council International (ACI). Airport Sustainability: A Holistic Approach to Effective Airport Management. Undated. http://www.aci-na.org/static/entransit/Sustainability%20White%20Paper.pdf.

Logan Airport Sustainability Management Plan (SMP)

In 2013, Massport was awarded a grant by FAA to prepare a SMP for Logan Airport. The Logan Airport SMP planning effort began in May 2013 and was completed in April 2015. The Logan Airport SMP takes a broad view of sustainability including economic vitality, operational efficiency, natural resource conservation, and social responsibility considerations. The Logan Airport SMP is intended to promote and integrate sustainability Airport-wide and to coordinate ongoing sustainability efforts across Massport. The Logan Airport SMP developed a framework and implementation plan, with metrics and targets, designed to track progress over time.

Massport is currently working on a vision for Massport's "Sustainability 2.0" as a next-level planning effort to implement principles and approaches from the SMP at other Massport facilities and to update Massport's sustainability goals and targets. Massport is currently advancing a series of short-term initiatives to help reach its goals (see **Table 1-1**) in the areas of (1) energy and GHG emissions; (2) water conservation; (3) community, employee, and passenger well-being; (4) materials, waste management, and recycling; (5) resiliency; (6) noise abatement; (7) air quality improvement; (8) ground access and connectivity; (9) water quality/stormwater; and (10) natural resources. Massport reports its progress towards achieving each goal, including changes in related performance, in sustainability reports. Since the publication of the Logan Airport SMP, Massport has continued expanding its sustainability initiatives, with an increased focus on implementing resliency measures to protect Maritime and Logan Airport operations, cirital infrastructure, and workforce.

The *Logan Airport Annual Sustainability Report*, first published in April 2016, provides a progress summary of sustainability efforts at Logan Airport based on Massport's sustainability goals and targets established in the Logan Airport SMP. It highlights Massport's progress towards improving sustainability and enhancing resiliency at its facilities. This report, now called the *Annual Sustainability and Resiliency Report*, was updated in 2019 and can also be found at: http://www.massport.com/massport/business/capital-improvements/sustainability/sustainability-management/.

Table 1-1 Logan Airport Sustainability Goals and Descriptions

Sustainability Category	**Goal**	**Sustainability Category**	**Goal**
Energy and Greenhouse Gas (GHG) Emissions	Reduce energy intensity and GHG emissions while increasing the portion of Massport's energy generated from renewable sources.	Water Conservation	Conserve regional water resources through reduced potable water consumption.
Community, Employee, and Passenger Well-being	Promote economically prosperous, equitable, and healthy communities and passenger and employee well-being.	Materials, Waste Management, and Recycling	Reduce waste generation, increase the recycling rate, and utilize environmentally sound materials.
Resiliency	Become an innovative and national model for resiliency planning and implementation among port authorities.	Noise Abatement	Minimize noise impacts from Logan Airport operations.
Air Quality Improvement	Decrease emissions of air quality criteria pollutants from Massport sources.	Ground Access and Connectivity	Provide superior ground access to Logan Airport through alternative and high-occupancy vehicle (HOV) travel modes.
Water Quality/Stormwater	Protect water quality and minimize pollutant discharges.	Natural Resources	Protect and restore natural resources near Massport facilities.

Leadership in Energy and Environmental Design (LEED®)-Certified Facilities at Logan Airport

The United States Green Building Council's (USGBC's) LEED rating system is the most widely recognized third-party green building certification system in North America. Massport is striving to achieve LEED certification for all new and substantial renovation building projects over 20,000 square feet. Most recently, in 2017, the Terminal E New Large Aircraft Wing (Terminal E Renovation and Enhancements Project) received LEED Gold certification for Commercial Interiors. Other recent examples of LEED-certified buildings at Logan Airport are the RCC and Green Bus Depot (see **Figure 1-10** and **Table 1-2**). Further details are available in Chapter 3, *Airport Planning*.

Figure 1-10 LEED-Certified Facilities at Logan Airport

Signature Flight Support General Aviation Facility, LEED Certified (2008)

Terminal A, LEED Certified (2006)

Rental Car Center, LEED Gold Certified (2015)

Green Bus Depot, LEED Silver Certified (2014)

Terminal E New Large Aircraft Wing, LEED Gold Certified (2017)

Sustainability Design Standards and Guidelines and LEED Certification

For smaller building projects and non-building projects, Massport uses its *Sustainable Design Standards and Guidelines* (SDSGs). The SDSGs provide a framework for sustainable design and construction for both new construction and rehabilitation projects. The SDSGs apply to a wide range of project-specific criteria, such as site design, project materials, energy management and efficiency, air emissions, water management quality and efficiency, indoor air quality, and occupant comfort. Massport is also using USGBC's sustainability focused Parksmart rating system, an environmental and sustainability focused rating system specific to parking structure management, programming, design, and technology.

Table 1-2 Leadership in Energy and Environmental Design (LEED)-Certified Facilities at Logan Airport

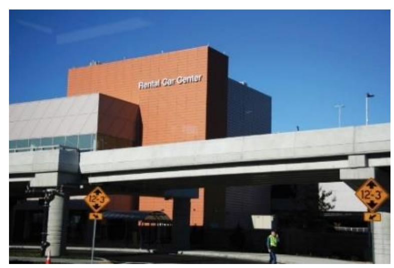
Terminal A (LEED Certified) Completed 2005/2006

- First airport terminal in the world to be LEED Certified
- Priority curb locations for high-occupancy vehicles (HOVs) and bicycles
- Retrofitting with solar panels on the Terminal A roof
- Stormwater filtration
- Reflective roof
- Water use reduction features
- Natural daylighting paired with advanced lighting technologies for energy efficiency
- Use of recycled and regionally sourced materials
- Measures to enhance indoor air quality

Signature Flight Support General Aviation Facility (LEED Certified) Completed 2007/2008

- Mechanisms to reduce water use
- Natural day lighting with advanced lighting technologies for energy efficiency
- Window glazing and sunshades to maximize daylight and minimize heat build-up
- Recycled and regionally sourced materials
- Measures to enhance indoor air quality

Rental Car Center (RCC) (LEED Gold) Completed 2013



- Green building materials
- Rooftop solar panels
- Bike and pedestrian access and connections
- Natural day lighting and advanced lighting technologies for energy efficiency
- Use of recycled and regionally sourced materials
- Enhanced indoor air quality
- Plug-in stations for electric vehicles and other alternative fuel sources such as E-85 (ethanol)
- Rental car fleets which include hybrid/alternative fuel/low emitting vehicles
- Pedestrian connections
- Bicycle facilities and employee showers/changing
- Water reclamation for vehicle wash water, and use of stormwater for non-potable uses such as vehicle washing and landscaping irrigation
- Vehicle miles traveled (VMT) reduction

Green Bus Depot (LEED Silver) Completed 2014

- Rooftop solar panels
- Water and energy saving features
- VMT reduction
- New shuttle fleet including clean diesel/electric hybrid buses and compressed natural gas (CNG) buses
- Sustainably grown, harvested, produced, and transported building materials

Table 1-2 Leadership in Energy and Environmental Design (LEED)-Certified Facilities at Logan Airport (Continued)

Terminal E New Large Aircraft Wing (LEED Gold - Commercial Interiors) Completed 2017

- Reduces heat island effect by providing a reflective white roof and a light color concrete tarmac
- Low-flow water fixtures and water closets
- Efficient light fixtures and efficient heating, ventilation, and air conditioning (HVAC) system
- Use of renewable energy sources
- Recycled and regionally sourced materials
- Enhanced indoor air quality
- Solar-thermal domestic hot water system to heat 100 percent of the wing's domestic water needs

Climate Change and Resiliency Planning

As the Boston area will continue to experience increased temperatures, more frequent extreme weather events, and higher sea level due to climate change,[25] Massport understands the importance of preparing for impacts to protect and enhance its critical infrastructure, operational assets, and workforce. Through robust planning and regional collaboration, Massport strives to continue its leadership role in resiliency planning among port authorities, the airport industry, and the Boston region.

At the end of 2013, Massport initiated a *Disaster and Infrastructure Resiliency Planning (DIRP) Study* for Logan Airport, the Port of Boston, and Massport's waterfront assets in South and East Boston. The DIRP Study includes a hazard analysis, modeling sea-level rise and storm surge, and projections of temperature, precipitation, and anticipated increases in extreme weather events. The DIRP Study provides recommendations regarding short-term strategies to make Massport's facilities more resilient to the likely effects of climate change. In 2014, the study was completed, and implementation of adaptation initiatives began, in late 2014.

In addition to the DIRP Study and its related initiatives, Massport has completed an Authority-wide risk assessment, as part of its strategic planning initiative; issued a *Floodproofing Design Guide*; and has developed a resilience framework to provide consistent metrics for short- and long-term planning and protection of its critical facilities and infrastructure. Beyond infrastructure resiliency, Massport is also focused on incorporating social and economic resilience into its long-term operational and capital planning. Massport's *Floodproofing Design Guide* was published in November 2014 and updated in November 2018.

Operational aspects of resiliency strategy include the development of Flood Operations Plans for Logan Airport and Massport maritime facilities. These plans were introduced in 2014 and included the planned deployment of temporary flood barriers to protect up to 12 locations of critical infrastructure in

25 City of Boston. 2016. *Climate Ready Boston*. https://www.boston.gov/sites/default/files/climatereadyeastbostoncharlestown_finalreport_web.pdf.

the event of severe weather. Additional locations have been permanently enhanced to prevent flooding. The flood operations plans are evaluated annually to enhance their effectiveness and to adapt to evolving requirements and past experiences.

Massport reports on progress towards resiliency goals in its Logan Airport Annual Sustainability Reports. Additional information about Massport's resiliency goals and initiatives is available at: http://www.massport.com/massport/business/capital-improvements/sustainability/climate-change-adaptation-and-resiliency/.

Massport Partnerships and Community Support

Massport has a long-standing commitment to be a good neighbor. Working in concert with government, community, and civic leaders throughout Massachusetts and New England, Massport is an active participant in efforts that improve the quality of life for residents living near Massport's facilities. Massport employees participated in a number of community activities in 2018 and 2019. In the spring, Massport employees participated in the City of Boston's annual neighborhood Boston Shines clean-up. At Thanksgiving, Massport employees provided food donations to three community programs, which served more than 500 families and individuals each month. In the fall, children ages four to 17 were provided with a new backpack filled with school supplies and new clothes at the start of the school year. Over the holidays, Massport invited students from neighboring communities and elementary schools to sing at Terminal A as part of its annual holiday music program.

Open Space/Buffer Program

Massport has invested in an extensive open space program to enhance the surrounding communities. Massport initially committed over $15 million for the planning, construction, and maintenance of four Airport edge buffer areas and two parks along Logan Airport's perimeter. These buffers include the Bayswater Embankment Airport Edge Buffer, Navy Fuel Pier Buffer, and the Southwest Service Area (SWSA) Buffer (Phases I and II). The award-winning Piers Park was completed in 1995 and has since become part of a network of greenspace that traverses East Boston from the Jeffries Point waterfront to Constitution Beach.

Adjacent to the current Piers Park, Piers Park Phase II will add approximately 4.2 acres of green space to the East Boston waterfront upon completion, and plans are underway by an outside party for Piers Park Phase III, which will turn an aging pier into a 3.6-acre greenspace that will include resiliency features to help protect the neighborhood from flooding and sea level rise. Today, East Boston enjoys 3.3 miles and more than 33 acres of green space developed or managed by Massport, in partnership with and in response to engagement with the East Boston community. More information can be found in Chapter 3, *Airport Planning*.

Figure 1-11 Parks Owned and Operated by Massport and City of Boston

Source: VHB.

Organization of the *2018/2019 EDR*

The remainder of this EDR includes:

- **Spanish Executive Summary** provides a translated version of the Executive Summary included after the English-version of Chapter 1, *Introduction/Executive Summary*.
- **Chapter 2, *Activity Levels***, presents aviation activity statistics for Logan Airport in 2018 and 2019 with a comparison to previous years. The specific activity measures discussed include air passengers, aircraft operations, fleet mix, and cargo/mail volumes.
- **Chapter 3, *Airport Planning***, provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2018 and 2019. It also describes known future planning, construction, and permitting activities and initiatives.
- **Chapter 4, *Regional Transportation***, describes activity levels at New England's regional airports in 2018 and 2019 and updates recent regional planning activities.
- **Chapter 5*, Ground Access to and from Logan Airport***, reports on transit ridership, roadways, traffic volumes, and parking for 2018 and 2019 with a comparison to previous years.
- **Chapter 6, *Noise Abatement***, updates the status of the noise environment at Logan Airport in 2018 and 2019 with a comparison to previous years, and describes Massport's efforts to reduce noise levels.
- **Chapter 7, *Air Quality/Emissions Reduction***, provides an overview of Airport-related air quality in 2018 and 2019 with a comparison to previous years, and efforts to reduce emissions.

- **Chapter 8, *Environmental Compliance and Management/Water Quality***, describes Massport's ongoing environmental management activities including NPDES compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan (MCP), and tank management.
- **Chapter 9, *Environmentally Beneficial Measures and Project Mitigation Tracking***, provides an overview of Massport's programs and initiatives that provide environmental benefits and reports on Massport's progress in meeting its MEPA Section 61[26] mitigation commitments for specific Airport projects.

MEPA Appendices: These include the Secretary's Certificate on the *2017 ESPR and* comment letters received on the *2017 ESPR* and responses to those comments, Secretary's Certificates on the EDRs/ESPRs issued for reporting years 2011 through 2017, a list of reviewers to whom this EDR was distributed, and a proposed scope for the *2020 EDR*. Also included in this section are the Secretary's Certificates on the Terminal E Modernization Project ENF, Draft EA/EIR, Final EA/EIR, and the Secretary's Certificate on the Logan Airport Parking Project ENF.

Appendix A – MEPA Certificates and Responses to Comments[27]
Appendix B – Comment Letters and Responses
Appendix C – Proposed Scope for the 2020 EDR
Appendix D – Distribution List

Technical Appendices:[28] These include detailed analytical data and methodological documentation for the various environmental analyses presented in and conducted for this EDR.

Appendix E – Activity Levels
Appendix F – Regional Transportation
Appendix G – Ground Access
Appendix H – Noise Abatement
Appendix I – Air Quality/Emissions Reduction
Appendix J –Environmental Compliance and Management/Water Quality
Appendix K – Peak Period Pricing Monitoring Reports
Appendix L – Reduced/Single Engine Taxiing at Logan Airport Memoranda

26 Massachusetts General Law, Chapter 30, Section 61 (M.G.L. c. 30, § 61) states that all agencies must review, evaluate, and determine environmental impacts of all projects or activities and shall use all practicable means and measures to minimize damage to the environment. For projects requiring an Environmental Impact Report, Section 61 Findings will specify all feasible measures to be taken to avoid or mitigate environmental impacts, the party responsible for funding the mitigation measures, and the anticipated implementation schedule for mitigation measures.

27 The Secretary's Certificates on the Terminal E Modernization Project Environmental Notification Form, Draft EA/EIR and Final EA/EIR are included in Appendix A. For convenience, Massport has responded to comments that relate to the EDR and ESPR.

28 Technical appendices are available on Massport's website at www.massport.com.

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Introducción/Resumen Ejecutivo

(Spanish Executive Summary)

1

Introducción/Resumen ejecutivo

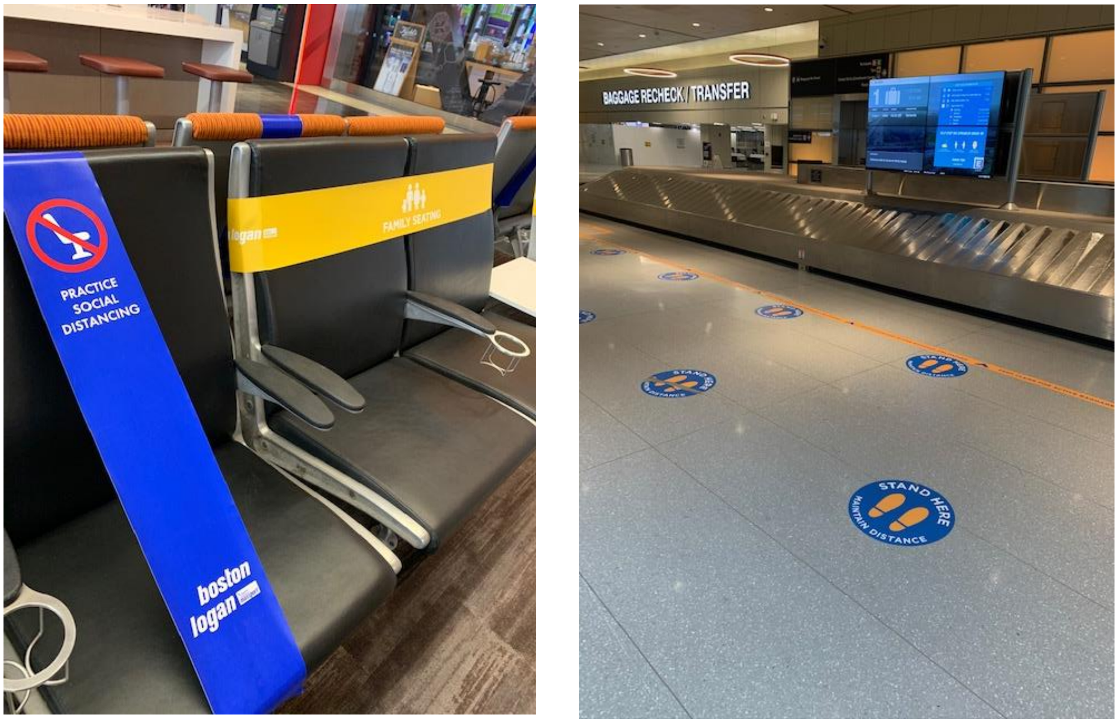
Introducción

Massachusetts Port Authority (Massport) continúa con su práctica de casi cuatro décadas de brindar un registro exhaustivo sobre las tendencias medioambientales, el planeamiento de las instalaciones, y los niveles de operaciones y de pasajeros del Aeropuerto Internacional Logan de Boston (Aeropuerto Logan o Aeropuerto) y los compromisos de mitigación de Massport en este *Informe de datos medioambientales (Environmental Data Report, EDR) de 2018/2019*. Como Massport ha hecho periódicamente después de la circulación y revisión de nuestros Informes de Estado y Planificación Ambiental (Environmental Status and Planning Reports, ESPR), con la aprobación del secretario de la Oficina Ejecutiva de Energía y Asuntos Ambientales (Executive Office of Energy and Environmental Affairs, EEA) de Massachusetts, este *EDR de 2018/2019* combina datos y análisis para los años naturales 2018 y 2019.

Este EDR fue preparado en el 2020 durante la pandemia de la COVID-19 en curso. Massport se ha esforzado por incluir actualizaciones relevantes hasta el otoño del 2020 inclusive, cuando las condiciones actuales dieron lugar a cambios en los proyectos o programas que estaban vigentes en el 2018 y 2019. A partir de marzo del 2020, los vuelos de entrada y salida del Aeropuerto Logan se redujeron drásticamente y los niveles de pasajeros disminuyeron en más del 90 por ciento en el pico de la pandemia en la primavera y el verano del 2020. Por lo tanto, actualmente hay muchas menos operaciones de aviones y pasajeros, y se produjo una caída dramática en la actividad general del Aeropuerto Logan. Si bien los niveles de actividad comenzaron a recuperarse lentamente a mediados del verano del 2020, la actual oleada de casos de COVID-19 ha dado lugar a niveles de actividad históricamente bajos y se prevé una recuperación total en los próximos años. En octubre del 2020, el total de operaciones de vuelo del año se redujo aproximadamente en un 50 por ciento y los niveles de pasajeros se redujeron en un 70 por ciento en comparación con los de enero a octubre del 2019. Massport prevé que, para finales del 2020, los niveles de pasajeros habrán bajado a niveles de actividad no observados desde mediados de la década de 1970.

Las disminuciones del tráfico aéreo causadas por las recesiones económicas y otras "perturbaciones", como los acontecimientos del 11 de septiembre del 2001 y la Gran Recesión del 2008/2009, han sido seguidas por ciclos de recuperación gradual. Como se muestra en la **Figura 1-1**, después de los acontecimientos del 11 de septiembre del 2001 y la recesión posterior, los niveles de actividad de los pasajeros del Aeropuerto Logan disminuyeron en alrededor del 18 por ciento, pero se recuperaron cinco años después. Los volúmenes de pasajeros del Aeropuerto Logan disminuyeron en alrededor de un 9 % después de la Gran Recesión del 2008/2009. Como se muestra en la **Figura 1-2**, en 2020 el promedio de siete días del caudal de detección de pasajeros la Administración de Seguridad en el Transporte (Transportation Security Administration, TSA) se redujo en más del 90 por ciento muy rápidamente. En la **Figura 1-3,** se muestra el cambio porcentual en el caudal mensual de la TSA desde el 2019 al 2020 para la nación y para Boston.

La COVID-19 está afectando de una manera sin precedentes no solo la industria de la aviación sino la economía mundial. Mientras que la preocupación inmediata y más apremiante es el costo humano, la COVID-19 ha creado profundas implicaciones para casi todos los negocios e industrias. El impacto en la aviación ha sido particularmente grave. La situación cambia a diario y sigue habiendo una incertidumbre considerable en cuanto a la duración de esta pandemia y sus repercusiones a largo plazo.

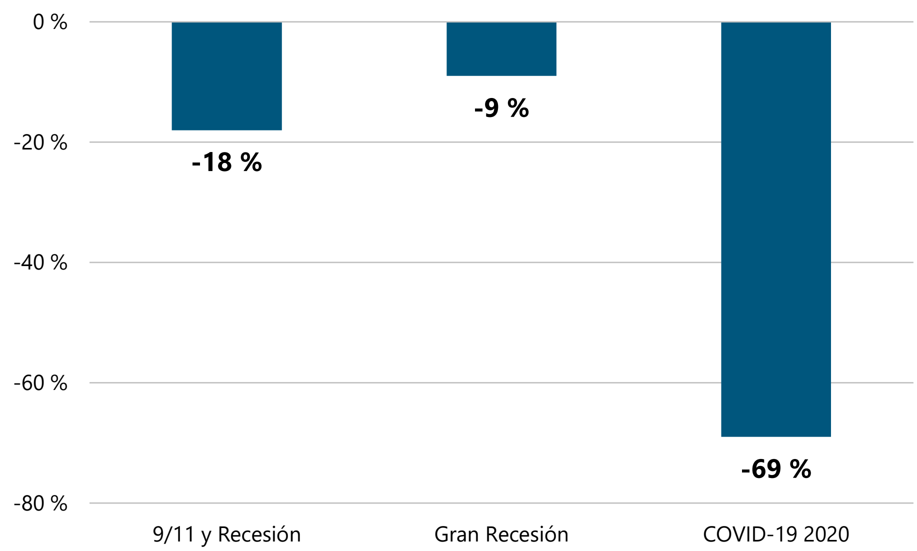


Fuente: Massport

Notas: Terminal de aeropuerto Logan (izquierda) y reclamo de equipaje (derecha) durante la pandemia de COVID-19.

Como resultado de esta significativa reducción en la actividad del Aeropuerto y la dramática reducción de los ingresos, tanto Massport como nuestras aerolíneas y otros locatarios han tenido que ajustar y reducir sus operaciones. Al mismo tiempo, el cronograma de varios proyectos y programas del Aeropuerto han sido revisados y retrasados. Para brindar la mayor transparencia posible, en el Capítulo 3, *Planeación aeroportuaria,* se incluyen las actualizaciones más recientes del proyecto hasta octubre del 2020. Los próximos EDR continuarán brindando actualizaciones, según estén disponibles. En general, Massport sigue evaluando y planificando la recuperación de las operaciones de las aeronaves y la actividad de los pasajeros aéreos, y sigue comprometida con la aplicación de la amplia gama de estrategias ambientales y operativas destinadas a reducir los impactos asociados a las operaciones del Aeropuerto.

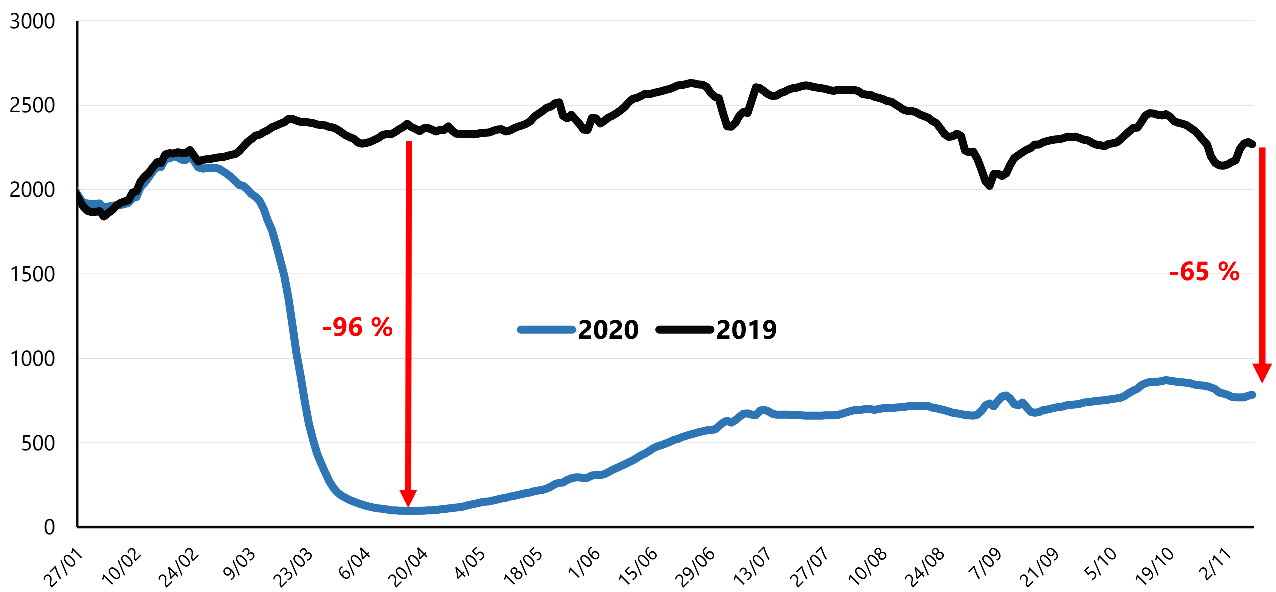
Figura 1-1 Cambio en el aumento de pasajeros del Aeropuerto Logan después de recesiones recientes



Fuente: InterVISTAS: Estadísticas de trafico de Massport..

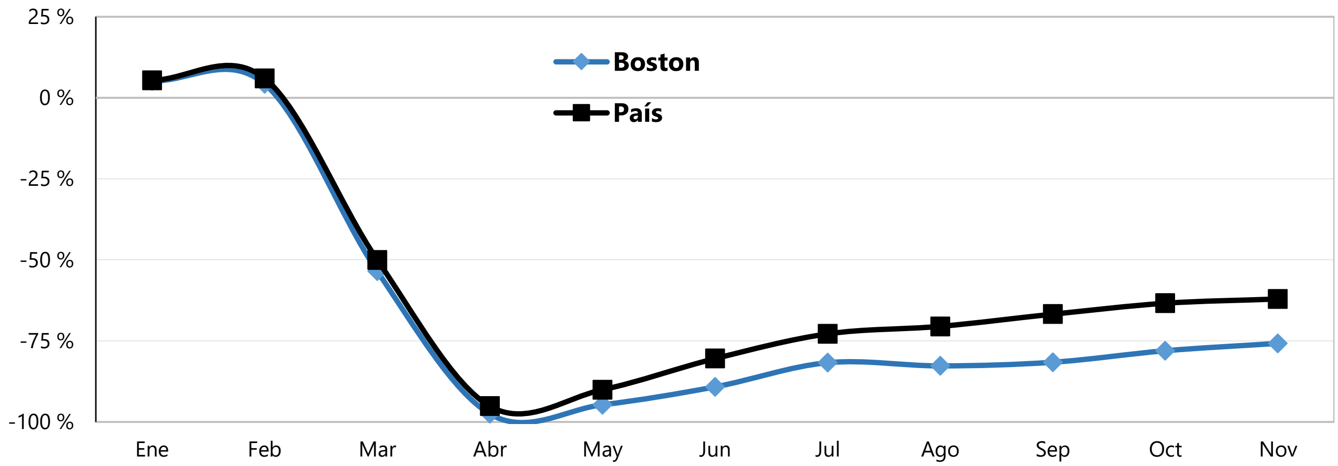
Nota: El cambio por la COVID-19 del 2020 es el año corrido hasta octubre del 2020 frente al 2019.

Figura 1-2: Promedio de siete días del caudal de la TSA en los aeropuertos de los EE. UU., 2019 frente al 2020



Fuente: Informes diarios de la TSA.

Figura 1-3: Cambio porcentual en el caudal mensual de la TSA desde el año anterior, enero del 2020 hasta noviembre del 2020



Fuente: Informes diarios de la TSA.

El Aeropuerto Logan, cuyo propietario y operador es Massport, cumple una función clave en las redes de transporte de pasajeros y de carga en el área metropolitana de Boston y de Nueva Inglaterra. Es el principal aeropuerto del área metropolitana de Boston, el aeropuerto más importante de Nueva Inglaterra en cuanto a los servicios de larga distancia y una gran puerta de entrada internacional a los EE. UU. para los servicios transatlánticos. Los límites del Aeropuerto abarcan aproximadamente 970 hectáreas en el East Boston y Winthrop, incluidas aproximadamente 283 hectáreas en el puerto de Boston. El Aeropuerto Logan comprende seis pistas, aproximadamente 24 140 metros de pistas para carreteo y aproximadamente 97 hectáreas de plataformas de cemento y asfalto. El Aeropuerto Logan tiene cuatro terminales de pasajeros interconectadas (Terminales A, B, C y E), cada una con sus propias instalaciones de emisión de pasajes, reclamo de equipaje y transporte terrestre. El Aeropuerto está a menos de cinco kilómetros del centro de Boston y se puede acceder a este por líneas de transporte público, numerosas líneas de autobuses directas y un sistema de carreteras bien conectadas. Massport también brinda el servicio de autobuses Logan Express desde y hacia el Aeropuerto Logan para los pasajeros de vuelos y para los empleados de una serie de aparcamientos de incentivo.

Este *EDR del 2018/2019* pertenece a una serie de documentos de revisión medioambiental anual entregados al secretario de la EEA, en cumplimiento con la Ley de Políticas Ambientales de Massachusetts (Massachusetts Environmental Policy Act, MEPA).[1] Desde 1979, Massport presenta estos documentos para informar los efectos medioambientales acumulados de las operaciones y de las actividades del Aeropuerto Logan. El Aeropuerto

1 Capítulo 30 de las leyes generales de Massachusetts, secciones 61-62H. La MEPA se implementa mediante las reglamentaciones publicadas en el Código de Normas de Massachusetts (Code of Massachusetts Regulations, CMR) 301 11.00 (las reglamentaciones de la MEPA).

Logan es el primer aeropuerto del país para el que se confeccionó una evaluación medioambiental anual sobre las actividades aeroportuarias y Massport continúa siendo líder en informes medioambientales.

Aproximadamente cada cinco años, Massport confecciona un ESPR, que brinda un panorama histórico y prospectivo del Aeropuerto Logan. Los EDR, que se confeccionan anualmente en los intervalos entre los ESPR, brindan una revisión histórica de las condiciones medioambientales para el año que se informa en comparación con el año anterior. Este *EDR del 2018/2019* sigue al *ESPR del 2017* que informó las condiciones del 2017, e incluyó proyecciones y análisis de las futuras operaciones y condiciones medioambientales en función de la predicción de pasajeros anterior a la COVID-19. Mientras Massport y toda la industria de la aviación continúan ajustándose a las nuevas condiciones operativas, nosotros seguimos evaluando los impactos actuales y futuros de la pandemia. Cuando es posible, este EDR incluye información relevante y actualizaciones. Sin embargo, será necesario realizar proyecciones y análisis más detallados en las próximas ESPRs.

El alcance de este *EDR del 2018/2019* conjunto se estableció mediante la certificación del secretario en el *ESPR del 2017* con fecha del 25 de noviembre del 2019, la que se incluye en el Apéndice A, *Certificados y respuestas a los comentarios de la MEPA*. Este EDR cumple todos los requisitos establecidos en la certificación del secretario en el *ESPR del 2017* e incluye respuestas a los comentarios en la certificación del secretario, y actualiza y compara los datos presentados en el *ESPR del 2017* sobre los siguientes temas:

- Niveles de actividad (incluidas las operaciones de las aeronaves, las actividades de los pasajeros y los volúmenes de carga)
- Planeación aeroportuaria (incluidas las actividades que están en curso y los proyectos venideros)
- Función del Aeropuerto Logan en la red de transporte regional
- Acceso terrestre desde y hacia el Aeropuerto
- Disminución del ruido
- Calidad del aire/Reducción de emisiones
- Calidad del agua/Cumplimiento medioambiental
- Sustentabilidad y resiliencia
- Medidas medioambientales beneficiosas y compromisos de mitigación

Para mejorar la utilidad de este EDR como documento de referencia para los revisores, este informe también presenta datos históricos sobre las condiciones medioambientales en el Aeropuerto Logan desde 1990, en las instancias en que hay información histórica disponible. Cuando corresponde y está disponible, este EDR también incluye actualizaciones hasta el otoño del 2020 inclusive.

Este EDR incluye una traducción al español de este capítulo. Esta versión traducida se incluye después de la versión en inglés del resumen ejecutivo.

EEA n.° 3247

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Proceso de revisión medioambiental del Aeropuerto Logan

Este *EDR del 2018/2019* es la próxima presentación de Massport en su proceso de revisión medioambiental estatal formal, único, pero bien consolidado, que evalúa los impactos medioambientales acumulados del Aeropuerto Logan. Los documentos brindan un contexto actual e histórico frente al cual los proyectos individuales del Aeropuerto Logan que alcanzan umbrales de revisión medioambiental estatales y federales se evalúan sobre las bases de proyectos específicos. A continuación, se describen los procesos de revisión medioambiental específicos del proyecto para todo el Aeropuerto.

Contexto histórico para el proceso de EDR/ESPR del Aeropuerto Logan

En 1979, el secretario de la EEA emitió un certificado solicitando a Massport que defina, evalúe y divulgue cada tres años el impacto del crecimiento a largo plazo del Aeropuerto a través de un Informe de impactos medioambientales genérico (Generic Environmental Impact Report, GEIR). En el certificado también se solicitaron actualizaciones anuales provisorias para brindar datos sobre las condiciones para los años entre los GEIR. El GEIR evolucionó hasta transformarse en una herramienta de planificación eficaz para Massport y brindó proyecciones de condiciones medioambientales para que los efectos acumulados de los proyectos individuales se puedan evaluar dentro de un contexto más amplio.

La EEA eliminó los GEIR después de las revisiones de 1998 para sus reglamentaciones de la MEPA. Sin embargo, la certificación del secretario sobre la actualización anual de 1997[2] propuso un proceso de análisis medioambiental revisado para el Aeropuerto Logan lo que dio como resultado la confección de los EDR/ESPR de Massport subsiguientes. El ESPR más amplio brinda un análisis de largo alcance de las operaciones, de los pasajeros y de los impactos acumulados proyectados, mientras que los EDR se confeccionan anualmente para brindar una revisión de las condiciones medioambientales para el año que se informa en comparación con el año anterior. Se desarrolló el proceso del EDR/ESPR para permitir que se analicen los proyectos individuales en el Aeropuerto Logan en un contexto más amplio en todo el Aeropuerto. Como se estableció en la introducción del *ESPR de 1999,* "mientras que el ESPR y el EDR de Logan brindan el contexto amplio de la planificación para los proyectos propuestos para el Aeropuerto Logan y los conceptos de planificación futuros que Massport analiza,

2 Certificación del secretario de la Oficina Ejecutiva de Asuntos Medioambientales sobre la actualización anual del Aeropuerto Logan de 1997, emitida el 16 de octubre de 1998.

no se puede crear ningún proyecto solamente en las bases de inclusión y análisis en el *ESPR de 1999"*. Luego, establece que los proyectos que cumplen con los umbrales de revisión de la MEPA o Ley Nacional de Políticas Ambientales (National Environmental Policy Act, NEPA) deben someterse a estos procesos, si es necesario. En resumen, los EDR/ESPR brindan un contexto de planificación acumulada que complementa las presentaciones individuales específicas del proyecto.

En el 2018 y 2019, si bien los niveles de pasajeros tuvieron un crecimiento significativo y alcanzaron nuevos niveles máximos, las operaciones de las aeronaves y los efectos medioambientales asociados se mantuvieron bien por debajo de los niveles analizados previamente para el Aeropuerto Logan. Por lo tanto, el crecimiento de la aviación pronosticado presentado en el *ESPR del 2004,* la afirmación sobre la que se estableció inicialmente el cronograma del ESPR, no se produjo. En consecuencia, con la aprobación del secretario, Massport confeccionó los *EDR del 2009 y del 2010* en lugar del ESPR originalmente planeado para el 2009. El *ESPR del 2011,* presentado a principios del 2013, informó sobre el año natural del 2011 y los pronósticos de los niveles actualizados de las actividades de los pasajeros y de las operaciones de las aeronaves. El *EDR del 2012/2013* conjunto presentó condiciones para ambos años naturales, 2012 y 2013. En el *EDR del 2014,* el *EDR del 2015* y el *EDR del 2016* se presentaron las condiciones para los años naturales del 2014, 2015 y 2016, respectivamente. Del mismo modo, con el fuerte crecimiento de pasajeros y la evolución de las tendencias de acceso terrestre con la industria emergente de las aplicaciones de transporte en coche (previamente conocido como empresas de red de transporte o transportation network company, TNC), la EEA permitió a Massport aplazar el *ESPR del 2016*.

El *ESPR del 2017* proporcionó un análisis integral acumulado de los niveles de actividad y de las condiciones medioambientales para el 2017 y un horizonte de planeación futura. En el ESPR, Massport propuso confeccionar un *EDR del 2018/2019* conjunto para informar los efectos de todas las actividades del Aeropuerto Logan basadas en la actividad de pasajeros y en las operaciones de las aeronaves reales en el 2018 y 2019. Este documento responde a la aprobación de la EEA del *EDR del 2018/2019* conjunto.

Si bien este informe se centra principalmente en los años 2018 y 2019, Massport ha incluido la mejor información disponible sobre el año 2020, a medida que la Autoridad y la nación reaccionan ante la pandemia de la COVID-19. Si corresponde, Massport continuará identificando y abordando cualquier tendencia de aviación y medioambiental a largo plazo tanto en los EDR como en los ESPR.

Revisión específica del proyecto

Aunque esta revisión de todo el Aeropuerto brinda el contexto de planificación más amplio para los proyectos propuestos y para los conceptos de planificación futuros, determinados proyectos del Aeropuerto también están sujetos al proceso público de revisión medioambiental específico del proyecto cuando cumplen los umbrales de revisión medioambiental estatal. Cuando se requiere, Massport y los locatarios del Aeropuerto presentan formularios de notificación ambiental (Environmental Notification Forms, ENF) e informes de impacto ambiental (Environmental Impact Reports, EIR) de conformidad con la MEPA. De manera similar, cuando se desencadena la revisión medioambiental de la NEPA, se revisan los proyectos de acuerdo con el proceso de revisión medioambiental de la NEPA.[3] Los proyectos actuales y futuros potenciales que se prevé que se sometan a la revisión de conformidad con la MEPA y/o NEPA se analizan en el Capítulo 3, *Planeación aeroportuaria*.

Contexto de la planificación del Aeropuerto Logan

El Aeropuerto Logan cumple una función clave en las redes de transporte de pasajeros y de mercadería del área metropolitana de Boston y de Nueva Inglaterra. El Aeropuerto es uno de los aeropuertos con terreno más limitado del país y está rodeado en tres laterales por el puerto de Boston (consulte las **Figuras 1-4** y **1-5**).

3 42 USC Sección 4321 et seq. La Administración Federal de Aviación (Federal Aviation Administration, FAA) implementa la NEPA mediante la ordenanza 1050.1E, Impactos medioambientales, de la FAA: Políticas y procedimientos, Administración Federal de Aviación, Departamento de Transporte de los Estados Unidos, fecha de entrada en vigor: 20 de marzo del 2006.

FIGURA 1-4 Vista aérea del Aeropuerto Logan

Informe de datos medioambientales 2018/2019

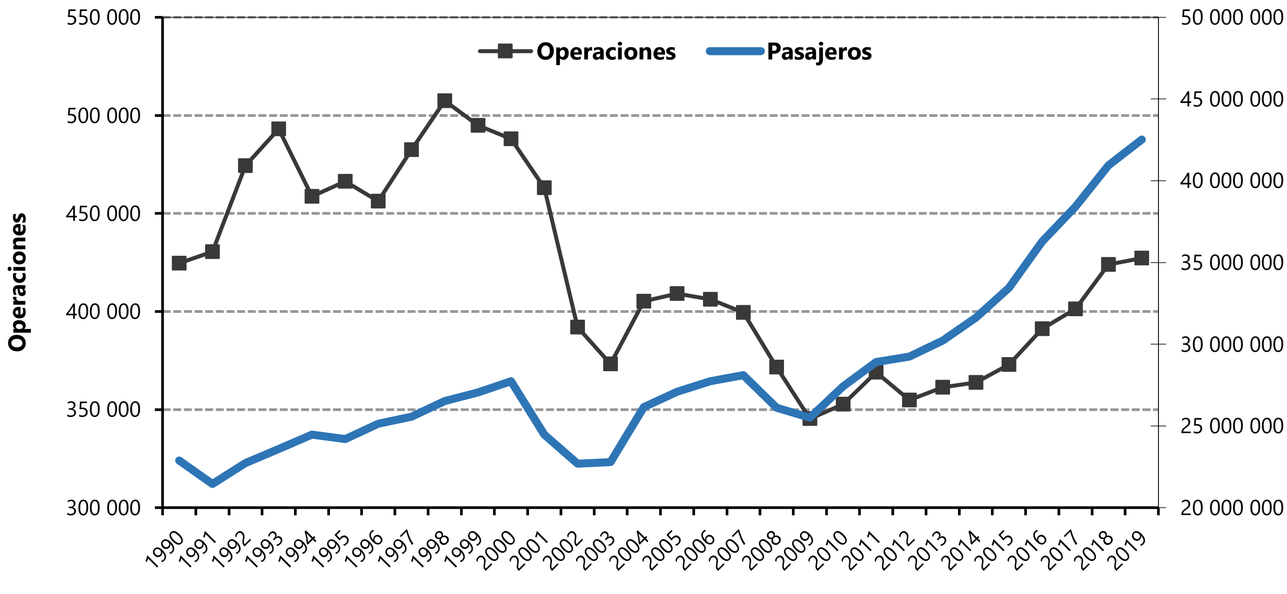
FIGURA 1-5 **Aeropuerto Logan y alrededores**

Informe de datos medioambientales 2018/2019

Crecimiento de la actividad de pasajeros y de aeronaves en el Aeropuerto Logan

En el 2019, los niveles de actividad de pasajeros aéreos en el Aeropuerto Logan alcanzaron 42,5 millones en todo momento, un aumento del 3,9 por ciento en comparación con el 2018 (40,9 millones). Como ha sido la tendencia reciente antes de marzo del 2020, las operaciones de las aeronaves aumentaron a un ritmo más lento que las de los pasajeros. En el 2019, las operaciones llegaron a un total de 427 176 y en el 2018 las operaciones llegaron a un total de 424 024. Estos dos niveles representan aumentos en comparación con los niveles de pasajeros de 38,4 millones y las 401 371 operaciones del 2017 (**Figura 1-6**). El crecimiento observado durante el 2018 y 2019 estuvo directamente correlacionado con las fuertes economías nacionales y regionales. Incluso con este crecimiento fuerte, las operaciones de las aeronaves permanecieron muy por debajo de las 487 996 operaciones del 2000 y del pico histórico de 507 449 operaciones alcanzadas en 1998. El crecimiento más lento de las operaciones de las aeronaves en comparación con los niveles de pasajeros se debe al aumento constante en el tamaño de las aeronaves y a la mejora en los factores de carga de las aeronaves (pasajeros/disponibilidad de asientos).

Figura 1-6 Niveles de pasajeros anuales y operaciones de aeronaves en el Aeropuerto Logan (1990-2019)



Debido a la COVID-19, los niveles de pasajeros y las operaciones del 2020 disminuyeron drásticamente. Hasta octubre del 2020, interanualmente los niveles de pasajeros y las operaciones han disminuido aproximadamente un 70 y un 50 por ciento, respectivamente.

Los niveles de actividad del Aeropuerto Logan están estrechamente ligados a la economía regional y nacional

Los niveles de actividad del Aeropuerto Logan son impulsados ampliamente por las economías locales, regionales y nacionales. Tal como puede verse al observar las tendencias a largo plazo, está claro que cuando la economía es fuerte, el Aeropuerto Logan crece. Análogamente, las disminuciones más importantes en los niveles de pasajeros y en el funcionamiento de las aeronaves se observan muy cerca de perturbaciones nacionales e internacionales importantes. Ejemplos de las disminuciones más significativas incluyen la huelga de la Organización de Controladores Profesionales de Tráfico Aéreo (Professional Air Traffic Controllers Organization, PATCO) en 1981, el 11 de septiembre del 2001, la Gran Recesión en el 2008/2009 y ahora la pandemia de la COVID-19.

Cuando ha habido un crecimiento significativo, como se observó hasta el 2018 y el 2019, Massport ha puesto en práctica estrategias para abordar ese crecimiento de manera que permita que el Aeropuerto Logan evolucione de manera sostenible y ambientalmente responsable.

El Aeropuerto Logan es el aeropuerto más grande de los seis estados de la región de Nueva Inglaterra, que tiene una población de aproximadamente 14,8 millones de residentes. El Aeropuerto está ubicado en Massachusetts, que alberga a 6,9 millones de residentes o cerca del 46 por ciento de la población de Nueva Inglaterra. El Aeropuerto Logan presta servicios a pasajeros de toda Nueva Inglaterra y la principal zona de influencia está compuesta por los siguientes cinco condados de Massachusetts: Essex, Middlesex, Norfolk, Plymouth y Suffolk (que incluye la ciudad de Boston). De acuerdo con las estadísticas disponibles más recientes, 4,4 millones de personas residen en esta área de cinco condados y, según las proyecciones, la población dentro del área de influencia aumentará un 0,5 por ciento por año en los próximos 19 años.[4] En el 2019, de manera similar a años anteriores, el área metropolitana de Boston mantuvo una menor tasa de desempleo (2,6 por ciento) que la de la Mancomunidad (2,9 por ciento) y que la del país entero (3,7 por ciento).[5] El Aeropuerto no solo atiende a una población en crecimiento, sino también a una población con mayores ingresos. El ingreso *per capita* en el 2019 fue de USD 68 361 (dólares estadounidenses en el 2012) en el área de servicios principal del Aeropuerto, 3,6 por ciento más alta que en la Mancomunidad y 35,9 por ciento más alta que el promedio nacional.[6]

El Aeropuerto Logan es un recurso de transporte y económico clave en la región de Nueva Inglaterra, en el estado y en el área metropolitana de Boston, que alberga una gran variedad de industrias. Las industrias con la mayor cantidad de empleados incluyen la atención médica y la asistencia social, los servicios educativos, profesionales, científicos y tecnológicos (que incluyen la próspera industria biotecnológica de Boston).[7] En el 2018 y 2019, Boston se ubicó en el puesto n.° 1 de ciudades de los

4 Woods & Poole Economics, Inc. 2019. Complete Economic and Demographic Data Source (CEDDS).
5 Oficina de estadística laboral (Bureau of Labor Statistics) de los EE. UU. 2020.
6 Woods & Poole Economics, Inc. 2019. ICF analysis of population and personal income datasets.
7 Oficina de Censos a través de Data USA. Boston-Cambridge, Newton, perfil del área metropolitana MA-NH, wwww.datausa.io.

EE. UU. en educación y 2.° en atención médica.[8] La contribución de la innovación y la creación de empresas también es evidente en las últimas estimaciones de crecimiento económico del 2019.

Además de respaldar el crecimiento y éxito económico del estado, el Aeropuerto Logan y la industria aeroportuaria son elementos importantes para la economía estatal y regional. La *Actualización del estudio del impacto económico del aeropuerto estatal de Massachusetts,* realizada por el Departamento de Transporte de Massachusetts (Massachusetts Department of Transportation, MassDOT) en el 2014 y actualizada más recientemente en 2019,[9] calcula que los aeropuertos de Massport (incluidos el Aeropuerto Logan, Worcester Regional Airport y Hanscom Field) contribuyen con aproximadamente USD 23,1 mil millones en producción a la economía de Massachusetts anualmente. De esta producción, el 71 por ciento se debe solo al Aeropuerto Logan.[10] La producción total incluye negocios dentro del aeropuerto, construcción, visitantes y efectos multiplicadores (consulte la **Figura 1-7**).[11] El Aeropuerto Logan respalda más de 162 000 puestos de trabajo directos e indirectos, al mismo tiempo que genera aproximadamente USD 16,3 mil millones por año en producción económica total.[12] En el 2019, se contrataron más de 23 000 personas en el Aeropuerto Logan. Esto incluyó a, aproximadamente, 820 miembros del personal y empleados administrativos adicionales de Massport del aeropuerto Logan.[13]

8 U.S. News & World Report 2020. Massachusetts.

9 MassDOT. 2014. *Actualización del estudio del impacto económico del aeropuerto estatal de Massachusetts.*http://www.massdot.state.ma.us/portals/7/docs/airportEconomicImpactSummary.pdf.

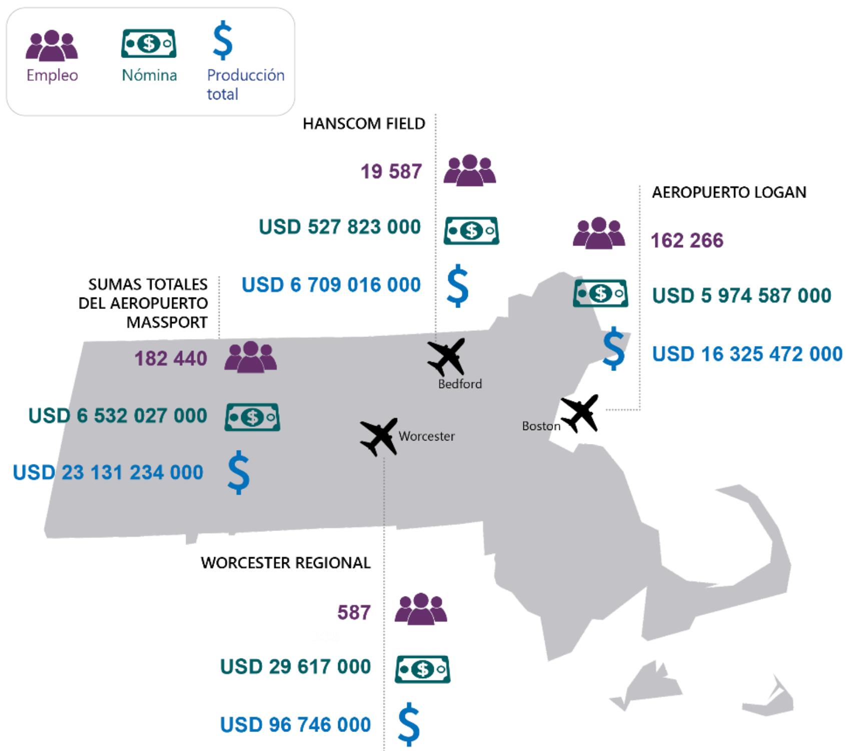
10 *Ibíd*.

11 Los efectos multiplicadores se refieren a la recirculación del dinero en la economía local después de haber sido gastados inicialmente por el Aeropuerto, sus locatarios o los turistas. Esta recirculación aumenta el impacto general de las operaciones del Aeropuerto en la economía local.

12 División de Aeronáutica de MassDOT. 2019. *Actualización del estudio del impacto económico del aeropuerto estatal de Massachusetts.* https://www.mass.gov/files/documents/2019/03/25/AeroEcon_ImpactStudy_January2019.pdf.

13 Massport, 2019. *Informe integral anual final del 2019 de la Autoridad Portuaria de Massachusetts.* http://www.massport.com/media/3425/mpa-fy19-cafr-final.pdf. Tabla S-11.

Figura 1-7 Impacto económico total de los aeropuertos de Massport



Fuente: MassDOT, Massachusetts Statewide Airport Economic Impact Study Update, 2019.
Notas: "Totales para Massachusetts" se refiere a la producción económica total de todos los aeropuertos de Massachusetts.

El Aeropuerto Logan se considera un aeropuerto de origen y destino (O&D)[14] tanto nacional como internacionalmente, lo que significa que, aproximadamente, el 90 por ciento de los pasajeros del Aeropuerto Logan inician o finalizan su viaje en el Aeropuerto Logan. Los aeropuertos principales, como el de Atlanta o Chicago, prestan servicios a muchos más pasajeros anualmente, pero en comparación con los aeropuertos de O&D, como el Aeropuerto Logan, pasa un porcentaje mayor de pasajeros en tránsito en los aeropuertos principales a través de los vuelos de conexión. Durante el 2019, el Aeropuerto Logan fue uno de los aeropuertos grandes con crecimiento más rápido de los Estados Unidos en cuanto a la

14 El "tráfico de origen y de destino" se refiere al tráfico de los pasajeros que se origina o que termina en un aeropuerto o en un mercado en particular. Un mercado de O&D fuerte, como Boston, genera una demanda local de pasajeros significativa, ya que muchos pasajeros inician y terminan su viaje en ese mercado. El tráfico de O&D es diferente al tráfico de conexión, que es tráfico de pasajeros que no inician ni terminan en el aeropuerto, sino que solo hacen conexiones en el aeropuerto en ruta hacia otros destinos.

cantidad de pasajeros.[15] Del 2017 al 2019, el tráfico de pasajeros aéreos en los EE. UU. creció un 9,1 por ciento, mientras que el Aeropuerto Logan experimentó un crecimiento de pasajeros del 10,7 por ciento.[16] El Aeropuerto Logan se considera un aeropuerto de origen y destino (O&D) nacional e internacional, lo que significa que, menos de 10 por ciento de los pasajeros aéreos están conectando por el aeropuerto Logan.

Estado de las predicciones

En el *ESPR del 2017*, se presentó una predicción actualizada para las operaciones de las aeronaves y la actividad de los pasajeros del Aeropuerto. La predicción se centró en un horizonte de planeación futura que incluyó una proyección de 50 millones de pasajeros aéreos anuales y 486 000 operaciones de aeronaves anuales. Las proyecciones del ESPR de Massport fueron congruentes con la proyección del área de la terminal de la Administración Federal de Aviación (FAA) en ese momento. Sin embargo, la pandemia de la COVID-19 redujo drásticamente el tráfico de pasajeros aéreos y, actualmente, se prevé que tomará unos cuantos años hasta que la industria vuelva a los niveles de operaciones previos a la COVID-19.

Durante el 2018 y el 2019, debido a la economía sólida, los niveles de actividad de los pasajeros y de las operaciones de aeronaves en el Aeropuerto Logan aumentaron rápidamente. Esta tendencia de crecimiento finalizó en marzo del 2020 y, en consecuencia, las proyecciones del *ESPR del 2017* tendrán que ajustarse a medida que se comprendan mejor los efectos a más largo plazo de la pandemia de la COVID-19.

Inversiones de Massport en el Aeropuerto Logan

Massport evalúa e implementa mejoras en el Aeropuerto Logan, en la seguridad, en la eficacia operativa y en el acceso desde y hacia el área metropolitana de Boston, mientras controla atentamente los efectos medioambientales de las operaciones del Aeropuerto Logan. Un enfoque continuo ha sido mejorar la experiencia del pasajero y del usuario en el Aeropuerto Logan. Los proyectos del área de la terminal recientes y en curso están destinados a brindar una conectividad posterior a la seguridad sin inconvenientes entre las terminales y mejoras al sistema de proceso de pasajeros a través de las áreas de verificación de seguridad consolidadas. El acceso al Aeropuerto Logan y sus alrededores continúa siendo una prioridad. Massport continúa trabajando con la FAA para mejorar la seguridad en la zona de operaciones a través de una variedad de mejoras en la seguridad del área de las pistas (runway safety area, RSA) y de simplificaciones en la geometría del campo de aviación

Como se mencionó anteriormente, los efectos de la pandemia de la COVID-19 han precipitado una gran serie de cambios en el Aeropuerto Logan. Tanto la disminución de los pasajeros como los ingresos asociados han requerido importantes ajustes en los servicios y en los cronogramas de los proyectos. Massport se ha centrado en ajustar los servicios para que se ajusten a los cambiantes niveles de pasajeros

15 Entre el 2014 y el 2019, el Aeropuerto Logan fue el 20.° aeropuerto con crecimiento más rápido en los EE. UU. en términos de tráfico local de O&D en comparación con los 30 aeropuertos principales de los EE. UU. (encuesta de O&D del Departamento de Transporte [Department of Transportation, DOT] de los EE. UU.).

16 ACI. 2019. Resumen del tráfico en los aeropuertos norteamericanos del ACI http://www.aci-na.org/content/airport-traffic-reports.

y en asegurar que esos cambios se hagan teniendo muy en cuenta la gestión de los impactos ambientales y de operación. En algunas áreas, se ajustaron los programas para reflejar las necesidades y los impactos actuales. Estos ajustes temporarios se describen en los capítulos técnicos correspondientes de este EDR. Massport sigue comprometida en implementar estrategias de mitigación relacionados a proyectos, como documentado en Capitulo 9, *Medidas que benefician al medioambiente y seguimiento del proyecto de mitigación*.

Aspectos destacados y hallazgos clave del 2018 y 2019

Esta sección brinda un breve resumen de los hallazgos clave, por capítulo, en el Aeropuerto Logan en el 2018 y 2019. También se incluye una breve actualización sobre la actividad en el 2020 y las proyecciones futuras a la luz de la pandemia de la COVID-19. Se ofrece información adicional sobre las actividades del Aeropuerto en los capítulos subsiguientes. Esta sección también destaca las iniciativas de Massport para una mayor sustentabilidad a través de proyectos específicos e iniciativas con una hoja de sustentabilidad y resume el programa de sustentabilidad de Massport.

El Certificado del Secretario sobre el *ESPR del 2017*, que constituye el alcance de este *EDR del 2018/2019*, reconoció el crecimiento rápido en los últimos años y le ordenó a Massport que proporcionara actualizaciones sobre la proyección del *ESPR del 2017*. Si bien el crecimiento reciente y rápido de pasajeros del Aeropuerto Logan continuó hasta principios del 2020, la pandemia de la COVID-19 comenzó a reducir drásticamente las operaciones del aeropuerto y los pasajeros a mediados de marzo del 2020. En las fases iniciales de la pandemia, los niveles de pasajeros disminuyeron por más del 90 por ciento. Si bien los niveles de actividad comenzaron a recuperarse lentamente a mediados del verano del 2020, la actual oleada de casos de COVID-19 ha dado lugar a niveles de actividad históricamente bajos y la recuperación total se dará en algunos años. En octubre del 2020, el total de operaciones de vuelo del año se redujo en un 50 por ciento y los niveles de pasajeros se redujeron en un 70 por ciento en comparación con los de enero a octubre del 2019. Massport prevé que, para finales del 2020, los niveles de pasajeros habrán bajado a niveles de actividad no observados desde mediados de la década de 1970. Hasta que no se comprendan mejor los impactos a largo plazo de la COVID-19, Massport solo puede hacer proyecciones preliminares de la tasa de recuperación de los niveles de pasajeros. El próximo EDR proporcionará más actualizaciones con la mejor información disponible en ese momento.

Niveles de actividad

Hasta el inicio de la pandemia de la COVID-19, el Aeropuerto Logan (y la industria de la aviación en general) había estado experimentando un fuerte crecimiento, en gran parte por las condiciones económicas positivas en la región de Boston, el bajo desempleo, una base económica diversa y fuerte, y la inversión continua en bienes raíces comerciales y residenciales, en ciencias biológicas en particular, en las finanzas, en la atención médica y en la educación superior. Debido a la pandemia de la COVID-19, los niveles de pasajeros y las operaciones del 2020 disminuyeron drásticamente. Hasta octubre del 2020, interanualmente los niveles de pasajeros y las operaciones han disminuido aproximadamente un 70 y un 50 por ciento, respectivamente.

Los niveles de actividad de pasajeros aéreos en el Aeropuerto Logan en el 2018 y 2019 aumentaron a 40,9 millones en 2018 y 42,5 millones en el 2019. Las operaciones de las aeronaves continuaron la tendencia a largo plazo de aumentar a un ritmo más lento que los pasajeros. En el 2018, las operaciones llegaron a un total de 424 024 y en el 2019 las operaciones llegaron a un total de 427 176. Ese crecimiento estuvo directamente correlacionado con la fuerte economía nacional y regional. Incluso con el fuerte crecimiento, las operaciones de las aeronaves permanecieron muy por debajo de las 487 996 operaciones del 2000 y del pico histórico de 507 449 operaciones alcanzadas en 1998. La combinación de un menor número de operaciones en aeronaves más limpias y silenciosas ha dado lugar a una reducción drástica de los impactos ambientales en comparación con los valores máximos históricos.

Del 2010 al 2019, la cantidad anual de pasajeros en el Aeropuerto Logan aumentó alrededor de un 55 por ciento, mientras que la cantidad anual de operaciones[17] aumentó más lentamente, alrededor del 21 por ciento, debido al aumento de los factores de carga de las aeronaves. Los niveles de pasajeros internacionales aumentaron más rápidamente que los niveles de pasajeros con destinos nacionales en el 2018 y 2019. Los niveles de actividad de los pasajeros aéreos con destinos domésticos aumentaron un 6,9 por ciento y un 2,6 por ciento en 2018 y 2019, respectivamente, mientras que los niveles de actividad de los pasajeros aéreos con destinos internacionales aumentaron un 5,3 por ciento y un 9,7 por ciento, respectivamente.

Consulte el Capítulo 2, *Niveles de actividad,* para obtener información adicional.

Planeación aeroportuaria

Massport continuamente mejora las instalaciones del Aeropuerto Logan para adaptarlo a los cambios de la demanda de pasajeros, de la actividad de las aeronaves, de las necesidades de las cargas y del acceso al transporte. En el Capítulo 3, *Planeación aeroportuaria*, Massport ha identificado proyectos de planeación e iniciativas prioritarios en las siguientes categorías:

- Transporte terrestre y estacionamiento.
- Terminales.
- Planificación de la zona de operaciones.
- Áreas de servicio.
- Amortiguadores del Aeropuerto y espacio abierto
- Energía, sustentabilidad y resiliencia

Durante el 2018 y 2019 se prestó gran atención a las medidas de reducción del acceso terrestre y de los viajes, y a las mejoras de las terminales. Los proyectos del área de la terminal recientes y en curso brindan una conectividad y flexibilidad posterior a la seguridad sin inconvenientes entre las terminales y mejoras al sistema de proceso de pasajeros a través de las áreas de verificación de seguridad consolidadas.

17 Una operación de una aeronave se define como un arribo o una partida.

Para mejorar la red de carreteras en el Aeropuerto, Massport está mejorando varios de los segmentos de carreteras e intersecciones del área de la terminal. En octubre del 2019, Massport abrió sus nuevas áreas consolidadas para recoger o dejar pasajeros de las aplicaciones de transporte en coche en Central Garage. En el 2018 y 2019, Massport también adelantó varios servicios de medios de transporte masivos (HOV) y realizó mejoras en las instalaciones de Logan Express como parte de sus objetivos de reducción de viajes.

Desde la presentación del *ESPR del 2017*, Massport ha completado la revisión medioambiental estatal y/o federal de numerosos proyectos:

- El Proyecto de Estacionamiento del Aeropuerto Logan, que añadirá 5000 espacios de estacionamiento comercial en el Aeropuerto Logan en ubicaciones que ya se usan para el estacionamiento. Los espacios de estacionamiento adicionales dependen de la aprobación de MassDOT y de la Agencia de Protección Medioambiental de los EE. UU. (EPA) de una modificación a la reglamentación del Congelamiento del Estacionamiento en el Aeropuerto Logan.[18] Los espacio adicionales tienen como objetivo reducir las modalidades para recoger/dejar pasajeros perjudiciales para el medioambiente (es decir, recoger o dejar pasajeros en vehículos privados, en taxi, aplicaciones de transporte en coche o mediante servicios de limusinas con chofer). El proceso de revisión conjunto de la MEPA/NEPA se completó en enero del 2020. Actualmente, este proyecto está aplazado debido a la reducción en la actividad de los pasajeros asociada con la pandemia de la COVID-19.
- El proyecto de la terminal C de la cubierta, conexiones y carreteras recibió la aprobación medioambiental federal según la NEPA en noviembre del 2018. Como se describe en el *ESPR del 2017*, la construcción de este proyecto sustituirá y reconfigurará secciones de las carreteras elevadas que conectan las Terminales B y C. En este momento, se prevé que el reemplazo de la cubierta comience y se complete en el 2021, con un programa ligeramente reducido respecto a lo previsto originalmente. Se prevé que se complete el conector de la Terminal B a la C en la primavera del 2022 y que las carreteras estén terminadas en el 2023.

Massport continúa trabajando con la FAA para mejorar la seguridad en la zona de operaciones a través de una variedad de proyectos en la seguridad del área de las pistas y de simplificaciones en la geometría del campo de aviación Consulte el Capítulo 3, *Planeación aeroportuaria,* para obtener más información.

Transporte regional

En el 2018 y 2019, se observó un aumento en la actividad de pasajeros aéreos en la región de Nueva Inglaterra. Los pasajeros aéreos de la región aumentaron en un 6,5 por ciento a 58,3 millones de pasajeros aéreos en el 2018 y luego otro 2,5 por ciento a 59,7 millones en el 2019. Los 10 aeropuertos regionales (sin incluir el Aeropuerto Logan) de Nueva Inglaterra prestaron servicios a 17,3 millones y 17,2 millones de pasajeros aéreos en el 2018 y 2019, respectivamente, en comparación con 16,3 millones de pasajeros en el 2017.

Worcester Regional Airport, T.F., Green Airport, Portland International Jetport, Burlington International Airport y Bangor International Airport experimentaron un aumento general de las operaciones de

18 Título 310, sección 7.30 del Código de Normas de Massachusetts, y título 40, sección 52.1120 del Código de Reglamentaciones Federales

servicios comerciales desde el 2017. Los aeropuertos Manchester-Boston Regional, Tweed-New Haven, Bradley International y Portsmouth International vieron reducida su oferta de servicios desde el 2017.

Los tres aeropuertos de Massport, el Aeropuerto Logan, Worcester Regional Airport y Hanscom Field contribuyeron de manera significativa con la economía regional, generando aproximadamente USD 23,1 mil millones anualmente o el 94 por ciento de los beneficios de la economía general generados por el sistema de aeropuertos de Massachusetts. Hanscom Field es un aeropuerto de relevo del Aeropuerto Logan y es el segundo aeropuerto con mayor actividad en Nueva Inglaterra.

En Worcester Regional Airport aumentó la cantidad de pasajeros en un 76 por ciento en el 2019 en comparación con el 2017, y se informó un total de aproximadamente 817 057 pasajeros desde el 2013 hasta el 2019. En los últimos cinco años, Worcester Regional Airport experimentó una tasa de crecimiento promedio del 10 por ciento por año. Massport continúa invirtiendo en Worcester Regional Airport. Junto con la ciudad de Worcester, Massport ya ha comenzado una inversión de USD 100 millones a 10 años para revitalizar y atraer operaciones comerciales en Worcester Regional Airport. Las inversiones incluyen un sistema de aterrizaje instrumental CAT III (alrededor de USD 32 millones) que se pagan con subvención federal y fondos de Massport. Además, jetBlue Airways, American Airlines y Delta Air Lines anunciaron un nuevo servicio al John F. Kennedy International Airport (JFK) de Nueva York, al Philadelphia International Airport y al Detroit Metropolitan Wayne County Airport, respectivamente. Desde la fecha de publicación de este EDR, se ha suspendido servicios comerciales de pasajeros desde Worcester Regional Airport debido a la baja en la demanda de los pasajeros como consecuencia de la pandemia de la COVID-19.

Los viajes de todo el sistema de trenes Amtrak aumentó de 31,7 millones de viajes de usuarios en el año fiscal (fiscal year, FY) 2018 a 32,5 millones de viajes en el FY 2019. En el FY 2018, el corredor noreste (Northeast Corridor, NEC) transportó más de 12 millones de pasajeros, alrededor de un 1 por ciento más que el año anterior. En el FY 2019, el NEC transportó más de 12,5 millones de pasajeros en esos servicios, alrededor de un 3 por ciento más que el año anterior.

Acceso terrestre

El Aeropuerto Logan continúa siendo uno de los principales aeropuertos de los Estados Unidos en cuanto a la modalidad de HOV y de viajes en transporte público. Massport promueve numerosas opciones de HOV, transporte público y viajes compartidos para mejorar las carreteras dentro del Aeropuerto y las operaciones en las aceras, para aliviar las limitaciones de estacionamiento y para mejorar el servicio al cliente. Los hallazgos clave del 2018 y 2019 se resumen en las viñetas a continuación y se pueden encontrar detalles adicionales en el Capítulo 5, *Acceso terrestre desde y hacia el Aeropuerto Logan*.

- El promedio de las millas viajadas por vehículos (vehicle miles traveled, VMT) dentro del Aeropuerto en los días de semana aumentaron alrededor de un 4,5 por ciento, del 2017 al 2018. Entre el 2018 y el 2019, el promedio de las VMT dentro del Aeropuerto en los días de semana aumentó en un 2,2 por ciento. El cambio en el tráfico diario promedio se puede atribuir principalmente a los aumentos en la actividad de los pasajeros, a la actividad de recoger/dejar pasajeros, a la carga y a los usos no relacionados con la aviación del Aeropuerto. Se prevé que la actividad en el Aeropuerto y las VMT dentro del Aeropuerto serán significativamente menores en el 2020 debido al impacto de la COVID-19.

- Las transacciones de las aplicaciones de transporte en coche alcanzaron un total de más de 7 millones en el 2018 y aumentaron a más de 8 millones en el 2019, un crecimiento de más del 16 por ciento. Las aplicaciones de transporte en coche tienen un impacto en otras modalidades de acceso al Aeropuerto y contribuyen a la congestión dentro del Aeropuerto. Parcialmente debido al continuo aumento de las aplicaciones de transporte en coche, los viajes en limusinas con chofer y los viajes programados en van disminuyeron en, aproximadamente, un 23 por ciento del 2017 al 2019. Los viajes en taxis disminuyeron un 14 por ciento en el 2018 en comparación con el 2017, y un 7 por ciento entre el 2018 y el 2019. La cantidad de pasajeros de la línea Blue de la Autoridad de Transporte de la Bahía de Massachusetts (Massachusetts Bay Transportation Authority, MBTA) aumentó en un 4 por ciento entre el 2017 y el 2018, y disminuyó en un 29 por ciento el año siguiente.
- En función de cambios en las elecciones de la modalidad de los pasajeros para acceder al Aeropuerto Logan entre el 2017 y el 2019, Massport actualizó sus objetivos y su definición de HOV. La definición actualizada considera que los taxis, las limusinas con chofer y las aplicaciones de transporte en coche que llevan a más de un pasajero aéreo por vehículo son HOV, mientras que las mismas modalidades con un pasajero aéreo no contarán como HOV. Con esta definición actualizada, Massport estableció un objetivo del 35,5 por ciento de HOV para el 2022 y del 40 por ciento para el 2027. Según los resultados de la Encuesta de acceso terrestre de pasajeros aéreos del 2019, la modalidad de HOV compartida alcanzó el 40,4 por ciento, superando tanto los objetivos a corto como a largo plazo. Si bien se prevé que la modalidad de HOV compartida disminuirá como resultado de la COVID-19 a corto plazo, Massport prevé que la cantidad de pasajeros en el HOV se recupere con el tiempo y sigue comprometido con los objetivos de la modalidad de HOV compartida en el futuro.

Estrategia para el acceso terrestre

Massport cuenta con una estrategia integral múltiple de reducción de viajes de larga data para diversificar y mejorar las opciones de transporte terrestre para los pasajeros y para los empleados que viajan desde y hacia el Aeropuerto Logan. La estrategia está diseñada para ofrecer a los pasajeros la oportunidad de elegir entre HOV, transporte público y opciones de viajes compartidos que son prácticas y confiables, y que reducen los impactos medioambientales y en la comunidad. Desde hace muchos años, el Aeropuerto Logan ocupa el puesto número uno en los aeropuertos de los EE. UU. en términos de HOV y modalidades de transporte público compartido. Massport promueve numerosas opciones de HOV, transporte público y viajes compartidos para mejorar las carreteras dentro del Aeropuerto y las operaciones en las aceras, para aliviar las limitaciones de estacionamiento y para mejorar el servicio al cliente.

La estrategia de Massport también tiene como objetivo brindar suficiente estacionamiento dentro del Aeropuerto para los pasajeros aéreos que eligen la modalidad de acceso en automóvil y/o que tienen opciones de HOV limitadas. En el 2017, MassDEP enmendó el Congelamiento del Estacionamiento en el Aeropuerto Logan para permitir un aumento de hasta 5000 espacios de estacionamiento comercial dentro del Aeropuerto, lo que permite la construcción de estacionamientos adicionales para reducir el uso de las modalidades para recoger/dejar pasajeros, y para aliviar las condiciones de estacionamiento limitado dentro del Aeropuerto.

Un interés de larga data de Massport es abordar la congestión de las carreteras dentro del Aeropuerto con una combinación de cambios en las políticas y con mejoras en la infraestructura. Es importante aliviar la congestión de la zona de las terminales para que las operaciones en tierra sigan siendo seguras y eficientes, y para reducir los impactos ambientales. Mejorar las opciones de transporte multimodal, y brindar una infraestructura moderna y flexible es una forma mediante la cual un aeropuerto puede reducir las emisiones de gases de efecto invernadero (greenhouse gas, GHG) y de mejorar su huella ecológica.

Massport reconoce la importancia de proporcionar servicios de HOV seguros y confiables desde y hacia el Aeropuerto, y para el 2019 ya había alcanzado su plan estratégico de aumentar la parte de la modalidad de HOV al 40 por ciento para el 2027. Comprender el crecimiento del uso de las aplicaciones de transporte en coche y su impacto en la congestión de las carreteras regionales y de las zonas de las terminales es esencial para gestionar el volumen de tráfico dentro del Aeropuerto y para promover los servicios de HOV como una alternativa viable y atractiva. Las reducciones de las posibles emisiones son una razón por la que Massport está comprometido con un objetivo a largo plazo para fomentar y respaldar el HOV público y privado, y los servicios de viajes compartidos dirigidos a los pasajeros aéreos, a los usuarios del Aeropuerto y a los empleados. Otros beneficios incluyen los siguientes:

- Reducir la congestión en las carreteras de las terminales y en las aceras de las áreas para recoger/dejar pasajeros.
- Aliviar las restricciones en las instalaciones de estacionamiento limitadas.
- Servicio al cliente (brindar una variedad de opciones de transporte para las diferentes características demográficas de los viajeros).

Aunque este informe se centra principalmente en la actividad en el 2018 y 2019, como consecuencia de la pandemia de la COVID-19, en el 2020 se modificaron temporalmente varias medidas de reducción del HOV y de los viajes de Massport. Los vuelos desde y hacia el Aeropuerto Logan se han reducido drásticamente y los niveles de pasajeros disminuyeron casi un 90 por ciento a partir de marzo del 2020. Como consecuencia, aunque los niveles operativos y de pasajeros se recuperaron un poco a mediados del 2020, en general, hay muchos menos pasajeros y empleados que viajan hacia y desde el Aeropuerto Logan y hay mucha menos congestión en las carreteras en el período pico tanto en Boston como en el área metropolitana. Además, el interés de la comunidad por utilizar los servicios de transporte HOV, como los autobuses, el tránsito rápido y el ferrocarril suburbano, se ha visto considerablemente afectado por las preocupaciones de la salud pública relacionadas con la COVID-19.

En ese contexto, Massport sigue evaluando y planificando la recuperación de la actividad de los pasajeros aéreos y mantiene su compromiso de implementar la amplia gama de estrategias de acceso terrestre que se esbozaron en el *ESPR del 2017* cuando demanda para estas medidas se recuperen. Sin embargo, el cronograma de esos servicios y las mejoras previstas se han ajustado debido a las continuas limitaciones operacionales y a las reducciones de ingresos. Massport continúa revisando cuidadosamente los niveles de actividad dentro y fuera del Aeropuerto, y ajustará sus programas de acceso terrestre para alinearlos con los niveles de cantidad de pasajeros. Los próximos EDR brindarán actualizaciones detalladas sobre todos los ajustes a los servicios y los niveles de actividades.

Massport evalúa continuamente sus estrategias y programas destinados a mejorar y, donde sea necesario, expandir los servicios de HOV hacia y desde el Aeropuerto Logan, incluida la continua inversión en las instalaciones y el servicio de Logan Express. Las iniciativas descritas a continuación pueden mejorar las

operaciones en las carreteras, así como la calidad de las emisiones atmosféricas. Las siguientes medidas se implementaron o siguen en análisis:

- El objetivo de duplicar la cantidad de pasajeros en Logan Express para cuando el Aeropuerto Logan alcance 50 millones de pasajeros aéreos al expandir el estacionamiento, la frecuencia y las mejoras en las instalaciones.
- **Mejoras al servicio suburbano de Logan Express**
  - En 2019, Massport aumentó la capacidad de asientos totales en el Logan Express en más de 10 por ciento.
  - Aumentar el servicio de Braintree Logan Express de dos a tres viajes por hora (implementado en mayo del 2019, pero reducido a un servicio por hora en marzo del 2020 debido a los impactos de la COVID-19).
  - Agregar unos 1000 espacios más a Framingham Garage (el permiso se completó en el 2020, pero la construcción está aplazada).
  - Brindar estado de prioridad en la cola de seguridad para los usuarios de Logan Express Back Bay (implementado en el 2019; este servicio está actualmente suspendido debido a la COVID-19).
  - Realizar campañas de publicidad para respaldar la estrategia de Logan Express y para aumentar la cantidad de pasajeros.
  - Implementar la emisión de boletos electrónicos para Logan Express (pendiente).
  - Evaluar las nuevas ubicaciones suburbanas de Logan Express, con un plan para abrir, al menos, un sitio nuevo (aplazado debido a la COVID-19).
  - Explorar las conexiones de destino final de las aplicaciones de transporte en coche.[19]
  - Continuar monitoreando la capacidad de estacionamiento en todos los sitios de Logan Express.
- **Línea Silver de la MBTA**
  - Massport adquirió ocho autobuses de la línea Silver de la MBTA en el 2005 y los opera la MBTA, y Massport paga los costos operativos. Dado que la flota existente de la línea Silver está llegando al final de su vida útil, la MBTA y Massport han estado trabajando juntos en un plan para conseguir una flota de reemplazo de la línea Silver. Como parte de esta iniciativa, Massport y la MBTA elaboraron un Estudio de capacidad de la línea Silver para determinar las necesidades a mediano plazo de la flota y las instalaciones, así como para evaluar otras formas de mejorar la confiabilidad y la capacidad del sistema En función de este análisis, la MBTA tiene previsto adquirir 45 nuevos vehículos híbridos eléctricos mejorados para sustituir la flota actual de 32 vehículos de modo dual. Massport planea comprar ocho autobuses de la línea Silver de la MBTA como parte de una próxima adquisición de la MBTA.

19 Las personas que se encuentran dentro de la distancia de 0,5 a 1 milla en coche de algunas de las instalaciones de Logan Express son el grupo que más probablemente utilice las empresas de red de transporte (Transportation Network Company, TNC) para realizar la conexión entre las instalaciones y su vivienda.

- **Servicio urbano de Logan Express**
  - Cambiar la ubicación para recoger/dejar pasajeros de la estación Copley a Back Bay (implementado en el 2019. Este servicio está temporalmente suspendido debido a la COVID-19).
  - Descuento en la tarifa de un solo trayecto de USD 7,50 a USD 3,00 (implementado en el 2019).
  - Proporcionar un servicio gratuito desde el Aeropuerto Logan (implementado a principios del 2019).
  - Estado de prioridad en la cola de seguridad para pilotos para los usuarios (implementado en el 2019).
  - Llevar a cabo campañas publicitarias para respaldar el aumento de la cantidad de pasajeros (en curso).
  - Implementar la emisión de boletos electrónicos para Logan Express (pendiente).
  - Implementar un segundo servicio urbano de Logan Express en la estación North (aunque Massport adquirió autobuses para este servicio en el 2020, debido a la COVID-19, este nuevo servicio ha sido aplazado).
- **Plan de manejo de aplicaciones de transporte en coche**
  - Facilitar el flujo de pasajeros y los viajes compartidos al trasladar la actividad de recoger/dejar pasajeros de las aplicaciones de transporte en coche a nuevas áreas especialmente destinadas a tal fin en Central Garage (completado).
  - Implementar el flujo constante de pasajeros[20] de las aplicaciones de transporte en coche para que los conductores que dejan un pasajero puedan retirarse con un pasajero más fácilmente (completado).
  - Introducir incentivos para los viajes compartidos de las aplicaciones de transporte en coche para reducir los vehículos de las aplicaciones de transporte en coche en los ingresos/las salidas al aumentar la cantidad de pasajeros en los vehículos (completado).
  - Adoptar una nueva estructura para las tarifas de las aplicaciones de transporte en coche para respaldar las estrategias de los HOV, alentar los viajes compartidos y reducir la congestión en los ingresos/las salidas (completado).
  - Optimizar las operaciones de las aplicaciones de transporte en coche dentro del Aeropuerto a través del informe de datos, de las herramientas de cumplimiento y de los nuevos productos de las aplicaciones de transporte en coche (en continuación).

20 El flujo constante de pasajeros permite que los conductores que dejan pasajeros instantáneamente recojan otros pasajeros sin la necesidad de dar vueltas en el Aeropuerto o de retirarse vacíos.

- **Mejoras en la infraestructura**
  - Massport continuará evaluando e identificando la necesidad de nuevas modificaciones a la infraestructura como complemento a los cambios en las políticas para permitir que las áreas de las carreteras y de las aceras continúen funcionando adecuadamente y para minimizar el tiempo que los vehículos están parados con los motores encendidos y las emisiones asociadas. Se implementarán los cambios según sean necesarios.

Ruido

Massport se esfuerza por minimizar los efectos del ruido de las operaciones del Aeropuerto Logan en sus vecinos mediante diferentes programas, procedimientos, estudios y demás herramientas para la disminución del ruido. En el Aeropuerto Logan, Massport implementa uno de los programas para la disminución del ruido más antiguos y amplios de cualquier aeropuerto del país. El programa integral de disminución del ruido incluye una Oficina para la Disminución del Ruido especializada, un sistema de monitoreo del ruido y de operaciones (Noise and Operations Monitoring System, NOMS) de avanzada, programas de protección acústica para viviendas y escuelas, restricciones de horarios y de pistas para los aviones más ruidosos, procedimientos de prueba de motores en tierra y rastreo de vuelos diseñado para optimizar las operaciones sobre el agua (especialmente durante las horas de la noche). La población puede dejar asentadas quejas por ruido por teléfono o en línea a través del sitio web de Massport.[21]

Los hallazgos clave se resumen en las viñetas a continuación y se pueden encontrar detalles adicionales en el Capítulo 6, *Disminución del ruido*.

- La mezcla de flota en el Aeropuerto Logan sigue estando compuesta por tipos de aeronaves con la tecnología más silenciosa disponible (la Fase 5 es la más silenciosa). Alrededor del 15 por ciento de las operaciones del 2018 y 2019 se realizaron con aeronaves que cumplen los requerimientos de la Fase 5, el 83 por ciento con aeronaves que cumplen los requerimientos de la Fase 4 y el 2 por ciento con aeronaves con certificación de Fase 3. Si bien el cambio a una flota toda Fase 4 y 5 ha sido gradual, es probable que las retiradas aceleradas de aeronaves más antiguas en el 2020 aumenten la proporción de Fase 5 en la flota del Aeropuerto Logan. El retiro de las aeronaves más viejas y ruidosas se ha acelerado por la pandemia de la COVID-19 y las aerolíneas continúan eliminando gradualmente las aeronaves más viejas en respuesta a la reducción de la carga de pasajeros a partir de la primavera del 2020. El *EDR del 2020* proporcionará un actualización sobre esta nueva tendencia.
- Massport y la FAA continúan trabajando con el Instituto Tecnológico de Massachusetts (Massachusetts Institute of Technology, MIT) para investigar las oportunidades de reducir el ruido mediante cambios en la navegación basada en el rendimiento (performance-based navigation, PBN), lo que incluye la navegación de área (area navigation, RNAV). Esta colaboración es el primer programa en el país entre la FAA y un operador aeroportuario para entender mejor lo que implica la PBN y evaluar las estrategias para abordar las preocupaciones de la comunidad.
- Massport sigue siendo un líder nacional en mitigación de la aislación sonora. Al día de la fecha, Massport proporcionó aislación sonora para un total de 36 escuelas y 11 515 unidades residenciales, y

21 Massport. Quejas por ruidos. http://www.massport.com/logan-airport/about-logan/noise-abatement/complaints/.

continuará buscando financiamiento para la aislación sonora de propiedades que son elegibles y cuyos propietarios eligieron participar. Desde el inicio del programa, se invirtieron más de USD 170 millones. En el 2019, Massport actualizó las curvas del mapa de exposición al ruido del Programa de Aislamiento Acústico Residencial (Residential Sound Insulation Program, RSIP) y presentó un mapa de exposición al ruido derivado de la Herramienta de Diseño Ambiental de la Aviación (Aviation Environmental Design Tool, AEDT) a la FAA en el 2020 para su revisión y análisis.

- Actualmente, Massport está trabajando con la FAA para, posiblemente, abordar este problema con la primera generación de ventanas de aislación acústica. En enero del 2020, el gerente de Massport envió una carta al administrador adjunto de la FAA solicitando que Massport y la FAA trabajen juntos para abordar el retratamiento de las viviendas a las que se les había realizado aislamiento acústico durante los primeros años del programa para renovar las viviendas elegibles con materiales más nuevos, más eficaces y más duraderos. El administrador adjunto respondió que la FAA está explorando circunstancias limitadas en las que Massport podría ser capaz de mitigar las viviendas que habían sido mitigadas antes de que la FAA emitiera las primeras normas de aislamiento acústico en 1993. El estado de la iniciativa se informará en los próximos EDR. Consulte el Apéndice H, *Disminución del ruido* para obtener más información.
- Las operaciones nocturnas representaron el 16,1 por ciento y el 16,6 por ciento de las operaciones totales en el 2018 y 2019, respectivamente. Las operaciones nocturnas aumentaron, de un promedio de 168 por noche en el 2017 a 187 por noche en el 2018 y a 195 por noche en el 2019. Los principales aumentos de la actividad comercial nocturna se produjeron en las operaciones con aeronaves de pasajeros, principalmente como resultado del crecimiento general de los vuelos de las compañías aéreas nacionales y el aumento de los vuelos a destinos internacionales. La mayoría (alrededor del 81 por ciento) de las operaciones nocturnas se produjeron antes de la medianoche o después de las 5:00 a. m.
- Se produjo una disminución general en el número total de personas que viven dentro de la curva de nivel de sonido promedio día-noche (Day-Night Average Sound Level, DNL) de 65 decibeles (dB) del 2017 al 2018. Sin embargo, el número dentro de la curva de DNL de 65 dB aumentó en Winthrop y Revere mientras que disminuyó en East Boston. Del 2017 al 2018, hubo un aumento en las operaciones totales y en las operaciones nocturnas, pero el factor principal en los cambios de la curva del DNL fue un cambio en el 2018 de retorno al uso típico de la pista después del cierre extendido de la pista 4L-22R en el 2017.
- Las curvas del DNL del 2019 son similares en forma y tamaño a las del 2018, con pequeños cambios debido a los cambios en el uso de la pista, los aumentos en las operaciones nocturnas y el crecimiento general de las operaciones en el 2019. La cantidad total de personas que residen en la curva de DNL de 65 dB aumentó de 7034 personas en el 2018 a 8768 en el 2019. La población adicional dentro de la curva de DNL de 65 dB se encuentra mayoritariamente en East Boston, principalmente debido a un aumento en las salidas de la pista 33L por un aumento de los vientos del noroeste en el 2019.
- En comparación con 1990, la cantidad total de personas que residen en la curva de DNL de 65 dB fue, aproximadamente, un 84 por ciento más baja y un 80 por ciento más baja en el 2018 y en el 2019, respectivamente, debido a una mejora en la tecnología de los motores.

Estrategia para el ruido

La base del programa contra el ruido de Massport son las *Normas y Reglamentaciones para la disminución del ruido en el Aeropuerto Logan*[22] (las Normas contra el ruido), que rigen desde 1986. La Oficina para la Disminución del Ruido de Massport se encarga de implementar medidas para la disminución del ruido y de monitorear, generalmente, las quejas de la comunidad y otros aspectos de los efectos del ruido de las operaciones del Aeropuerto Logan.

Massport está enfocado en las siguientes iniciativas para la disminución del ruido:

- **Asociaciones con aerolíneas y con la FAA**
    - Massport alienta la modernización de la familia de aerobuses A319/320/321 de aeronaves con generadores en vórtice, lo que reduce el ruido tonal al acercarse. En octubre del 2018, jetBlue Airways (la aerolínea con mayor cantidad de operaciones en el Aeropuerto Logan) anunció planes para modernizar su flota de aerobuses más antigua con generadores de vórtices. Este movimiento refleja la asociación entre Massport y las aerolíneas para reducir el ruido de las aeronaves para beneficiar a las comunidades circundantes. A medida que las aerolíneas modernizan las aeronaves y hacen la transición a los nuevos modelos de la familia A320, se prevé que la cantidad de aeronaves que operan en el Aeropuerto Logan sin generadores de vórtice disminuya. Para obtener más información, consulte un comunicado de prensa en el que se analizan los generadores en el Capítulo 6, *Disminución del ruido*.

Imagen de un dispositivo generador de vórtice por puerto

    - El 7 de octubre del 2016, Massport y la FAA firmaron un memorando de entendimiento (Memorandum of Understanding, MOU)[23] para darle un marco al proceso para el análisis de oportunidades para reducir el ruido mediante cambios o enmiendas a la navegación basada en el rendimiento (PBN), incluida la navegación de área (RNAV). Esta colaboración es el primer programa en el país entre la FAA y un operador aeroportuario para entender mejor lo que implica la PBN y evaluar las estrategias para abordar las preocupaciones de la comunidad. El MIT es el líder técnico. El Bloque 1 se completó a finales del 2017 y se hicieron recomendaciones a la FAA. Actualmente, el MIT está llevando a cabo el análisis del Bloque 2.

22 Las Normas y Reglamentaciones para la Disminución del Ruido en el Aeropuerto Internacional Logan, vigentes a partir del 1 de julio de 1986, se codifican como código 740 de las normas de Massachusetts (Code of Massachusetts Regulations, CMR) 24.00 et seq (también denominadas Normas contra el ruido).

23 Massport. 7 de octubre del 2016. *Massport y la FAA trabajan para reducir el ruido de los sobrevuelos (Massport and FAA Work to Reduce Overflight Noise)* https://www.massport.com/news-room/news/massport-and-faa-work-to-reduce-overflight-noise/.

- La flota que opera en el Aeropuerto Logan está compuesta en un 83 por ciento por aeronaves de fase 4 y en un 15 por ciento por aeronaves de fase 5 (las de fase 5 son las más silenciosas), muy por encima de los motores de fase 3, exigidos como mínimo por la FAA.
- Massport continúa prohibiendo el uso de la pista 4L para las salidas y de la pista 22R para los arribos desde las 11:00 p. m. hasta las 6:00 a. m., maximizando las operaciones sobre el agua tarde a la noche, usando las pistas 15R y 33L, y restringiendo el aumento del volumen de los motores y el uso de las unidades de potencia auxiliar (auxiliary power units, APU) a la noche.
- Massport continúa alentando el uso voluntario del carreteo con uso reducido de motores cuando corresponde y es seguro (consulte el Apéndice L, *Memorando de la reducción del carreteo/carreteo con un solo motor en el Aeropuerto Logan*).
- Massport continúa mejorando el sistema de monitoreo del ruido. Massport salió a la puja en el 2018 y seleccionó al proveedor anterior en el 2019. Comenzaron las actualizaciones en el sistema y algunos monitoreos de ruido.

- **Programa para la protección contra el sonido**
  - Massport cuenta un de los programas de protección contra el sonido en viviendas y en escuelas más amplio del país. Al día de la fecha, Massport ha instalado protección acústica en 5467 viviendas, incluidas 11 515 unidades de viviendas y 36 escuelas en East Boston, en Roxbury, en Dorchester, en Winthrop, en Revere, en Chelsea y en South Boston. Desde el inicio del programa, se invirtieron más de USD 170 millones.
  - Aproximadamente, el 8 por ciento de los solicitantes también eligieron la opción de Habitación de preferencia que permite que el propietario señale una habitación (generalmente un dormitorio o la sala de estar) para el tratamiento con acústica adicional.

Calidad del aire/Reducción de emisiones

Las emisiones totales de todas las fuentes relacionadas con el Aeropuerto Logan son menores a las de hace una década, a excepción del NO_x. Esta tendencia hacia la disminución es congruente con el objetivo de larga data de Massport de adaptarse a las demandas del aumento de pasajeros y de los niveles de actividad de las cargas con menos operaciones de aeronaves y menos emisiones en donde sea posible. En comparación con el 2017, los cambios en las emisiones atmosféricas en el 2018 y 2019 siguen estando dentro de los valores dado el repunte correspondiente de las operaciones de las aeronaves. Debido a la pandemia de la COVID-19, hay menos operaciones de aeronaves y pasajeros, y disminuyó la actividad en general en el Aeropuerto Logan. Las reducciones en las operaciones de aeronaves y los viajes de acceso terrestre probablemente traigan como consecuencia reducciones en las emisiones en el 2020.

Massport confeccionó listados de emisiones para el 2018 y 2019 para los criterios de los siguientes contaminantes: monóxido de carbono (CO), partículas (PM_{2019}/PM_{10}) y compuestos orgánicos volátiles (COV), así como gases de efecto invernadero (GHG) y óxidos de nitrógeno (NO_x). Los hallazgos clave de estos listados de emisiones incluyen los siguientes:

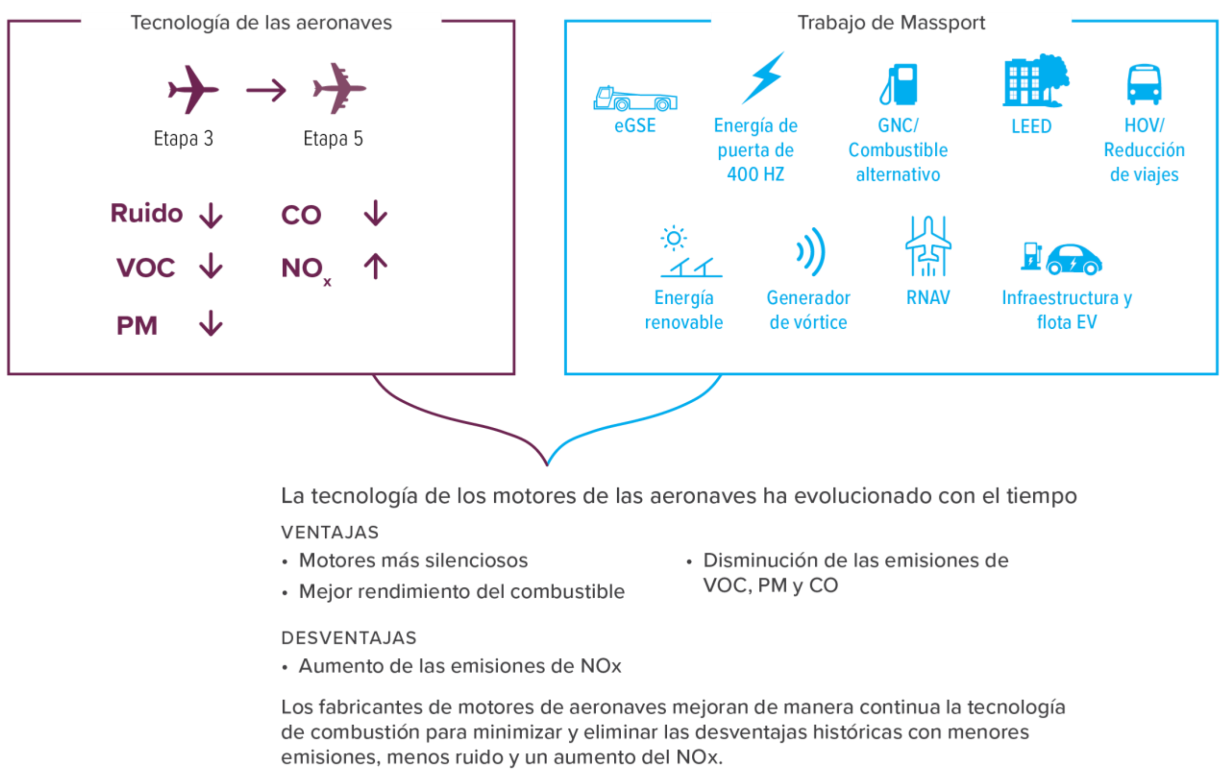
- El total de las emisiones modelizadas de CO, $PM_{10}/PM_{2,5}$ y NO_X, aumentaron del 2017 al 2018 en, aproximadamente 14 por ciento, 17 por ciento y 4 por ciento, respectivamente. Los VOC permanecieron constantes. Estos aumentos se atribuyeron principalmente al aumento del 5,6 por ciento en las operaciones de las aeronaves en el 2018 en comparación con el 2017. Las variaciones en las emisiones también se debieron a los parámetros de combinación de fuselaje/motor incluidos en las dos versiones de modelo utilizadas y a las diferencias asociadas en los factores de emisión aplicados asumidos en los modelos.
- En el 2019, las emisiones modelizadas totales de CO, $PM_{10}/PM_{2,5}$ y VOC aumentaron, cada una, en alrededor del 2 por ciento desde el 2018. En cambio, las emisiones de NO_X aumentaron en alrededor del 5 por ciento. Estos cambios también se deben a un aumento en las operaciones de las aeronaves del 0,7 por ciento así como variaciones leves en la mezcla de la flota de aeronaves del 2018 al 2019. Además, el aumento de las emisiones de NO_X en el 2019 se asocia con un mayor uso de combustible de fuentes estacionarias en ese año.
- Las emisiones de CO, VOC y NO_x modelizadas asociadas con el equipo de servicio terrestre (Ground Service Equipment, GSE) y con los vehículos con motor, sobre muchas de las cuales Massport tiene influencia, han disminuido del 2018 al 2019. Las emisiones de $PM_{10}/PM_{2,5}$ permanecen estables. Si bien hay diferencias en las versiones de los modelos entre el 2017 y 2018, lo que causa variaciones en las emisiones entre esos años, en general el GSE y los vehículos con motor muestran una tendencia decreciente entre el 2017 y 2019 para todos los contaminantes.
- El total de las emisiones de GHG del Aeropuerto Logan aumentó del 2017 al 2018 en, aproximadamente, un 10 por ciento y del 2018 al 2019 en, aproximadamente, un 4 por ciento. Estos aumentos se deben, principalmente, al aumento en las operaciones de las aeronaves (es decir, 5,6 por ciento en el 2018 y 0,7 por ciento en el 2019). Las emisiones de GHG asociadas con el Aeropuerto Logan en el 2018 y 2019 son, aproximadamente, un 1 por ciento de las emisiones calculadas más recientemente en todo el estado.

Efecto de la tecnología de los motores de las aeronaves en el NO_x

Las emisiones de las aeronaves continúan representando la fuente más grande (95 por ciento) de NO_x en el Aeropuerto Logan, seguidas por otras fuentes (2 por ciento), el equipo de servicio terrestre (GSE) (2 por ciento) y por los vehículos con motor (1 por ciento). Massport no tiene ningún control sobre las emisiones de las aeronaves, que representan la gran mayoría de las emisiones totales del aeropuerto.

Para reducir el uso de combustible y las emisiones, los diseñadores y los fabricantes de los motores de las aeronaves siguen trabajando para producir motores que ahorren más combustible (es decir, que quemen menos combustible). Esto se logra mejorando el desempeño del motor con tecnologías de combustión mejoradas, mayor poder de propulsión y menor desgaste del motor. También se están diseñando aeronaves para disminuir la quema de combustible con avances en la aerodinámica de las alas y del cuerpo de las aeronaves, con materiales de aleaciones livianas y mejores medios de navegación. Se prevé que estas nuevas tecnologías y la reducción en la quema de combustible reduzcan las emisiones, reduzcan el ruido y moderen el crecimiento de las emisiones de NO_x en el futuro.

Figura 1-8 La tecnología de los motores de las aeronaves ha evolucionado con el tiempo



Estrategia para la calidad del aire

La estrategia de Massport para el manejo de la calidad del aire para el Aeropuerto Logan se centra en la disminución de las emisiones de las fuentes relacionadas con el Aeropuerto. Debido a que Massport no tiene un control directo sobre las operaciones de las aeronaves ni de las elecciones de las flotas de las aerolíneas, continúa enfocándose en las áreas que Massport sí controla o sobre las que tiene posibilidades de ejercer influencia. La estrategia para el manejo de la calidad del aire de Massport para el Aeropuerto Logan se enfoca en la reducción de las emisiones de las fuentes relacionadas con el Aeropuerto, además de continuar innovando en formas de lograr las reducciones de las emisiones en todo el Aeropuerto. Massport ha establecido una cantidad de metas y objetivos para abordar las emisiones atmosféricas de las operaciones del Aeropuerto, lo que incluye la reducción de las emisiones de los GSE y de la flota de vehículos de Massport. Massport está enfocado en las siguientes iniciativas:

- **Brindar infraestructura y fomentar prácticas que respalden las reducciones de las emisiones de las aeronaves.**
    - Massport brinda aire preacondicionado (pre-conditioned air, PCA) y energía de 400 hertz (Hz) en todas las puertas de contacto de las aeronaves para reducir el tiempo en que las aeronaves tienen los motores encendidos y el uso de APU.

  - Massport fomenta los procedimientos de carreteo con un solo motor por parte de las aerolíneas cuando seguro, para reducir tanto el ruido como las emisiones atmosféricas.
  - Uso de remolcadores a batería y cargadores de cintas para la flota de servicio terrestre de Delta Air Lines en la Terminal A. Massport está avanzando en sus planes para extender la infraestructura de GSE a batería a otros lugares.

- **Maximizar el uso del HOV y reducir los viajes en autos con un solo pasajero, especialmente los viajes para recoger/dejar pasajeros, y el uso de vehículos privados por parte de los pasajeros desde y hacia el Aeropuerto.**
  - Massport implementa una amplia estrategia para el HOV y mejoras en el transporte terrestre (consulte la siguiente sección, Estrategia de acceso terrestre, para obtener detalles).
- **Reducir las emisiones de las flotas que operan en el Aeropuerto Logan**
  - Massport está facilitando el reemplazo del GSE que funciona con gasolina y con diésel por equipos que sean completamente eléctricos (electric GSE, eGSE) para finales del 2027 (según estén disponibles comercialmente). En el 2018, la Agencia de Protección Medioambiental (Environmental Protection Agency, EPA) de los EE. UU. otorgó una subvención a Massport para reemplazar el GSE que funciona con gasolina y diésel en el Aeropuerto Logan. Esta subvención se usará junto con una subvención del programa Bajas Emisiones Voluntarias en Aeropuertos (Voluntary Airport Low Emissions, VALE) de la FAA que Massport recibió en el otoño del 2018 para instalar estaciones de carga de eGSE como parte del Proyecto de optimización de la Terminal B. En el 2019, a través del mismo programa, Massport recibió fondos para la infraestructura de carga de JetBlue Airways en la Terminal C. Massport contribuyó a la instalación de 42 estaciones de carga de eGSE.
  - En el 2019, Massport recibió una subvención a través del programa de subvenciones de la convocatoria abierta Volkswagen Diesel Settlements & Environmental Mitigation del Departamento de Protección Ambiental de Massachusetts (MassDEP), con el objetivo de reducir las emisiones de NO_X y GHG, para adquirir eGSE en asociación con jetBlue. Con esto, se reemplazarán 31 unidades de GSE por nuevos eGSE y se instalarán cuatro estaciones de carga de eGSE en la Terminal C. United Airlines también buscó esta subvención de forma privada y se le concedió la financiación.
  - Además, en el 2019 Massport recibió de la EPA, una subvención de DER para sustituir 44 GSE a diésel por tractores de equipaje, cargadores de cintas y remolcadores de retroceso totalmente eléctricos. Los propietarios de GSE del Aeropuerto Logan contribuirán con lo mismo.
- **Brindar infraestructura para respaldar los combustibles alternativos, incluido el gas natural comprimido (GNC) y la electricidad**
  - Massport continúa operando una de sus estaciones minoristas de GNC más grandes de Nueva Inglaterra, que está abierta al público. En el 2018 y 2019, la estación de GNC dispensó aproximadamente el equivalente a 25 750 y 24 445 galones de gasolina por mes para todos los vehículos de la flota de Massport (vehículos que no pertenecen a Massport también usaron GNC).

    - Massport respalda los sistemas estándar actuales y futuros para los vehículos eléctricos (electric vehicles, EV) que se enchufan. Massport instaló 13 estaciones para cargar EV, para abastecer a un total de 26 vehículos en Central Garage y en las zonas de estacionamiento de la Terminal B. Massport aumentó la disponibilidad de las estaciones de carga de EV de modo que el 150 por ciento de esta demanda está disponible en todas las instalaciones en todo momento y seguirá evaluando la demanda a medida que regresen los niveles de actividad de los pasajeros. Actualmente, hay 123 puertos de carga instalados en el Aeropuerto Logan y más en las instalaciones de Logan Express.

- **Reducir las emisiones de los vehículos de la flota de Massport**
    - Massport continúa operando y aumentando su flota de 54 vehículos con combustible alternativo (alternative fuel vehicle, AFV)/vehículos con energía alternativa (alternative power vehicle, APV) en los autobuses de enlace dentro del Aeropuerto. Massport también tiene una política de adquisición de vehículos que exige que se tengan en cuenta los AFV cuando se realicen compras.
- **Reducir emisiones asociadas a los edificios de Massport, incluidas las necesidades energéticas**
    - Massport se ha comprometido a alcanzar la certificación Leadership in Energy and Environmental Design (LEED®) para los edificios elegibles, según corresponda.
    - Massport continúa invirtiendo en instalaciones de energía renovable dentro del Aeropuerto (solar/eólica).

Cumplimiento y manejo medioambiental/Calidad del agua

El enfoque de Massport en cuanto al manejo medioambiental y al cumplimiento es un componente clave de su compromiso con la sustentabilidad y con las prácticas responsables en el Aeropuerto Logan. Mediante el monitoreo y la documentación, Massport evalúa el desempeño medioambiental y desarrolla, implementa, evalúa y mejora las políticas y los programas continuamente. Massport promueve las prácticas medioambientales apropiadas a través de la prevención de la contaminación y de las medidas de descontaminación. Massport también trabaja estrechamente con los locatarios y con el personal de operaciones del Aeropuerto Logan para intentar mejorar continuamente el cumplimiento medioambiental. Los hallazgos clave de este EDR incluyen los siguientes:

- En el 2018, aproximadamente, el 97 por ciento de las muestras de aguas pluviales de Massport cumplieron con los requisitos del permiso del Sistema Nacional de Eliminación de Descarga de Contaminantes (National Pollutant Discharge Elimination System, NPDES) y en el 2019, aproximadamente, el 99 por ciento de las muestras cumplieron con este.
- Massport cuenta con su Sistema de Manejo Medioambiental (Environmental Management System, EMS) de la Organización Internacional de Normalización (ISO) 14001 desde el 2006.
- Massport actualiza y mantiene anualmente su Plan de Prevención de la Contaminación del Agua Pluvial (Stormwater Pollution Prevention Plan, SWPPP) para el Aeropuerto Logan.
- Massport continuá evaluando, descontaminando y llevando sus sitios del Plan de Contingencia de Massachusetts a un cierre reglamentario.

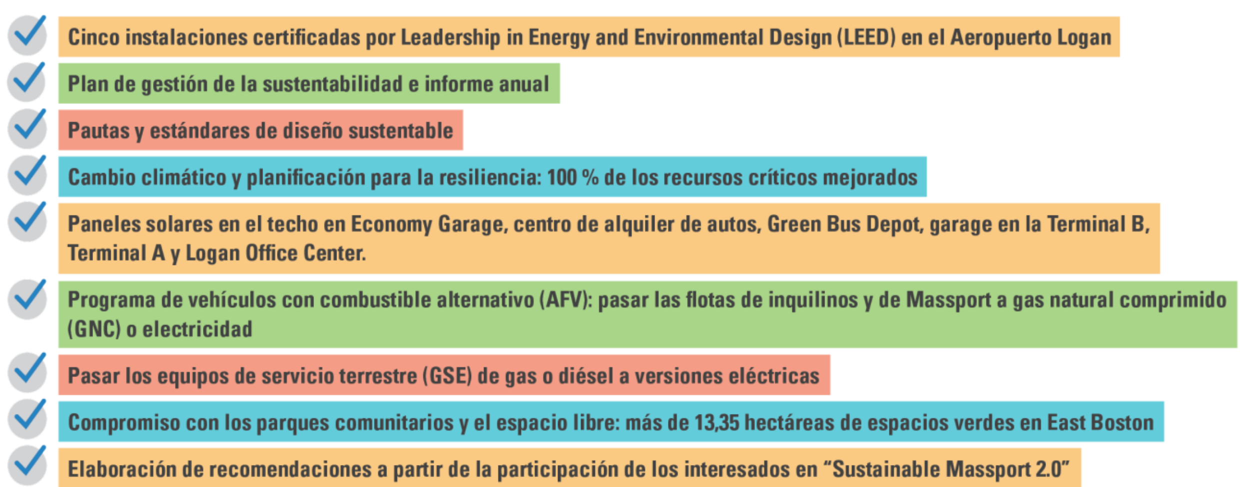
- En el 2018, se informaron ocho derrames, similar al 2017. Se vieron afectadas seis bocas de tormenta, esto representó un aumento con respecto a las dos del 2017. En el 2019, se informaron 22 derrames, los que afectaron 9 bocas de tormenta.

Para obtener información adicional, consulte el Capítulo 8, *Cumplimiento y manejo medioambiental/Calidad del agua*.

Programa de sustentabilidad y resiliencia

Massport está comprometido con un programa de sustentabilidad sólido. La sustentabilidad ha redefinido los valores y los criterios para medir el éxito organizacional al usar un enfoque de resultado triple que toma en cuenta el bienestar económico, ecológico y social. Aplicar este enfoque a la toma de decisiones es una manera práctica de optimizar el capital económico, medioambiental y social. Massport tiene una amplia visión de la sustentabilidad que se basa en el concepto de resultado triple y toma en cuenta el contexto específico del aeropuerto. En congruencia con la definición de la sustentabilidad de los aeropuertos del Consejo Internacional de Aeropuertos - Norteamérica (Airports Council International - North America, ACI-NA),[24] Massport se centra en un enfoque holístico para el manejo del Aeropuerto Logan para garantizar la viabilidad económica, la eficacia operativa, la conservación de los recursos naturales y la responsabilidad social (Economic viability, Operational efficiency, Natural resource conservation, and Social responsibility, EONS). Massport está comprometido con la implementación de prácticas sustentables para el medioambiente tanto por parte del Aeropuerto como por parte de las autoridades y continúa progresando en diferentes iniciativas. Las siguientes secciones resumen muchas de las iniciativas de sustentabilidad a largo plazo y multifacéticas llevadas adelante por Massport, que se describen de manera más detallada en los capítulos individuales de este *EDR del 2018/2019*, si corresponde. La **Figura 1-9** destaca algunas de las iniciativas de sustentabilidad recientes de Massport.

Figura 1-9 Aspectos destacados de sustentabilidad recientes



24 Consejo Internacional de Aeropuertos (ACI) Airport Sustainability: A Holistic Approach to Effective Airport Management. Sin fecha. http://www.aci-na.org/static/entransit/Sustainability%20White%20Paper.pdf.

Plan de manejo para la sustentabilidad (SMP) del Aeropuerto Logan

En el 2013, la FAA le otorgó a Massport un subsidio para preparar un plan de manejo para la sustentabilidad (Sustainability Management Plan, SMP) para el Aeropuerto Logan. Las iniciativas de planificación del SMP del Aeropuerto Logan comenzaron en mayo del 2013 y se completaron en abril del 2015. El SMP del Aeropuerto Logan tiene una amplia perspectiva de sustentabilidad que incluye el estudio de la vitalidad económica, de la eficacia operativa, de la conservación de los recursos naturales y de la responsabilidad social. El SMP del Aeropuerto Logan tiene como objetivo promover e integrar la sustentabilidad en todo el Aeropuerto, y coordinar las iniciativas de sustentabilidad en curso en todo Massport. El SMP del Aeropuerto Logan desarrolló un marco y un plan de implementación, con mediciones y objetivos diseñados para hacer un seguimiento del progreso en el tiempo.

Actualmente, Massport trabaja sobre la visión de "Sustentabilidad 2.0" de Massport como una próxima medida de planificación para implementar los principios y enfoques del SMP en otras instalaciones de Massport, y para actualizar las metas y los objetivos de sustentabilidad. Actualmente, Massport está avanzando en una serie de iniciativas a corto plazo para ayudar a alcanzar sus objetivos (consulte la **Tabla 1-1**) en las áreas de (1) energía y emisiones de GHG, (2) conservación del agua, (3) bienestar de la comunidad, de los empleados y de los pasajeros, (4) materiales, manejo de los desperdicios y reciclado, (5) resiliencia, (6) disminución del ruido, (7) mejora de la calidad del aire, (8) acceso terrestre y conectividad, (9) calidad del agua/desagües pluviales y (10) recursos naturales. Massport informa su progreso para alcanzar cada objetivo, incluidos los cambios en el desempeño relacionado, en los informes de sustentabilidad. Desde la publicación del SMP del Aeropuerto Logan, Massport ha continuado expandiendo sus iniciativas de sustentabilidad, enfocándose cada vez más en la implementación de las medidas de resiliencia para proteger las operaciones marítimas y del Aeropuerto Logan, la infraestructura crítica y la mano de obra.

El *Informe Anual de Sustentabilidad del Aeropuerto Logan*, publicado por primera vez en abril del 2016, brinda un resumen del progreso de las iniciativas de sustentabilidad en el Aeropuerto Logan en función de los objetivos y de las metas de Massport establecidas en el SMP del Aeropuerto Logan. Destaca el progreso de Massport hacia la mejora de la sustentabilidad y hacia la mejora de la resiliencia en sus instalaciones. Este informe, que ahora se denomina *Informe Anual de Sustentabilidad y Resiliencia*, se actualizó en el 2019 y también se puede encontrar en: http://www.massport.com/massport/business/capital-improvements/sustainability/sustainability-management/.

Tabla 1-1 Objetivos y descripciones de sustentabilidad del Aeropuerto Logan

Categoría de sustentabilidad	Objetivo	Categoría de sustentabilidad	Objetivo
Energía y emisiones de gases de efecto invernadero (GHG)	Reducir la intensidad de la energía y las emisiones de GHG mientras se aumenta la parte de energía de Massport generada a través de fuentes renovables.	Preservación del agua	Preservar los recursos de agua regionales mediante la reducción del consumo de agua potable.
Bienestar de la comunidad, de los empleados y de los pasajeros	Promover comunidades económicamente prósperas, equitativas y sanas, y el bienestar de los pasajeros y de los empleados.	Materiales, manejo de los desperdicios y reciclado	Reducir la producción de desperdicios, aumentar la tasa de reciclado y utilizar materiales ecológicos.
Resiliencia	Transformarse en un modelo innovador y nacional para la planificación de resiliencia y para la implementación entre las autoridades portuarias.	Disminución del ruido	Minimizar los impactos del ruido de las operaciones del Aeropuerto Logan.
Mejora de la calidad del aire	Disminuir las emisiones de los contaminantes del aire de las fuentes de Massport.	Acceso terrestre y conectividad	Proporcionar un acceso terrestre al Aeropuerto Logan superior mediante medios de transporte alternativos y medios de transporte masivos (HOV).
Calidad del agua/Desagües pluviales	Proteger la calidad del agua y minimizar los desechos de contaminantes.	Recursos naturales	Proteger y restaurar los recursos naturales en las cercanías de Massport.

Instalaciones certificadas por Leadership in Energy and Environmental Design (LEED®) en el Aeropuerto Logan

El sistema de calificación LEED de United States Green Building Counsil (USGBC) es el sistema de certificación de construcciones ecológicas de terceros más reconocido en los Estados Unidos. Massport se esfuerza por alcanzar la certificación LEED para todos los proyectos de construcción nuevos y de renovación sustancial sobre más de 1858 metros cuadrados. Más recientemente, en el 2017, la nueva ala de aeronaves grandes de la Terminal E (Proyecto de renovación y mejoras de la Terminal E) recibió la certificación LEED dorada para los interiores comerciales. Otros ejemplos recientes de construcciones certificadas por LEED en el Aeropuerto Logan son el centro de alquiler de autos (Rental Car Center, RCC) y Green Bus Depot (consulte **la Figura 1-10** y la **Tabla 1-2**). Hay más detalles disponibles en el Capítulo 3, *Planificación del Aeropuerto*.

Figura 1-10 Instalaciones certificadas por LEED en el Aeropuerto Logan

Instalaciones de aviación general que respaldan los vuelos característicos, certificación de LEED (2008)

Terminal A, certificación de LEED (2006)

Centro de alquileres de autos, certificación dorada de LEED (2015)

Green Bus Depot, certificación plateada de LEED (2014)

Nueva ala para aeronaves grandes en la Terminal E, certificación dorada de LEED (2017)

Estándares de diseño sustentable y pautas, y certificación LEED

Para los proyectos de construcción más pequeños y para los proyectos que no son de construcción, Massport usa sus *Estándares de diseño sustentable y pautas (Sustainable Design Standards and Guidelines,* SDSG). Los SDSG brindan un marco para el diseño y para la construcción sustentables tanto para la construcción nueva como para los proyectos de rehabilitación. Los SDSG se aplican a una amplia variedad de criterios específicos del proyecto, como el diseño del sitio, los materiales del proyecto, el manejo de la energía, las emisiones atmosféricas, el manejo de la calidad y la eficiencia del agua, la calidad del aire en el interior y la comodidad de los ocupantes. Massport también usa el sistema de calificación centrado en la sustentabilidad Parksmart del Consejo de Construcción Sustentable de los EE. UU. (US Green Building Council, USGBC), un sistema de calificación centrado en el medioambiente y en la sustentabilidad, específico para el manejo, la programación, el diseño y la tecnología de las estructuras de estacionamiento.

Tabla 1-2 Instalaciones certificadas por Leadership in Energy and Environmental Design (LEED) en el Aeropuerto Logan

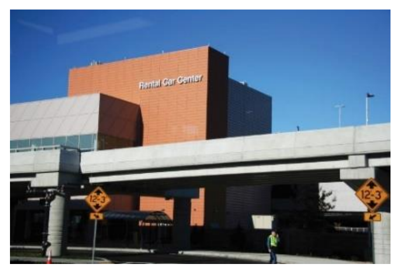
Terminal A (certificación LEED), completada en el 2005/2006

- Primera terminal aeroportuaria en el mundo en recibir la certificación LEED
- Aceras con prioridad para medios de transporte masivos (HOV) y para bicicletas
- Modernización con paneles solares en el techo de la Terminal A
- Filtración de los desagües pluviales
- Techo reflectante
- Características de reducción del consumo de agua
- Iluminación diurna natural junto con tecnologías de iluminación avanzadas para la eficiencia de la energía
- Uso de materiales reciclados y de fuentes regionales
- Medidas para mejorar la calidad del aire en el interior

Instalaciones de aviación general que respaldan los vuelos característicos (certificación LEED), completadas en el 2007/2008

- Mecanismos para reducir el uso del agua
- Iluminación diurna natural con tecnologías de iluminación avanzadas para la eficiencia de la energía
- Acristalamiento de las ventanas y sombrillas para maximizar la luz diurna y para minimizar el calentamiento
- Materiales reciclados y de fuentes regionales
- Medidas para mejorar la calidad del aire en el interior

Centro de alquiler de autos (RCC) (certificación LEED dorada), completado en 2013



- Materiales de construcción ecológicos
- Paneles solares en el techo
- Accesos y conexiones para bicicletas y peatones
- Iluminación diurna natural y tecnologías de iluminación avanzadas para la eficiencia de la energía
- Uso de materiales reciclados y de fuentes regionales
- Calidad del aire en el interior mejorada
- Estaciones para enchufar vehículos eléctricos y otras fuentes de combustible alternativo como el E-85 (etanol)
- Flotas de autos de alquiler que incluyen vehículos híbridos/de combustible alternativo/de emisiones bajas
- Conexiones para peatones
- Instalaciones para bicicletas y duchas, vestuarios para empleados
- Recuperación del agua para el lavado de autos y uso de desagües pluviales para los usos no potables, como el lavado de vehículos y el riego.
- Reducción de las millas viajadas por vehículos (VMT)

Green Bus Depot (certificación LEED), completado en el 2014

- Paneles solares en el techo
- Características de ahorro de agua y energía
- Reducción de VMT
- Nueva flota de transportes compartidos que incluyen autobuses a diésel limpio/autobuses híbridos eléctricos y autobuses a gas natural comprimido (GNC).
- Materiales de construcción sembrados, cosechados, producidos y transportados de manera sustentable

Tabla 1-2 Instalaciones certificadas por Leadership in Energy and Environmental Design (LEED) en el Aeropuerto Logan (cont.)

Nueva ala para aeronaves grandes en la Terminal E (certificación LEED dorada para interiores comerciales), completada en el 2017

- Reducción del efecto isla de calor al proporcionar un techo blanco reflectante y asfalto de concreto de color claro
- Instalaciones para el agua y para retretes de flujo bajo
- Instalaciones para la luz eficientes, y calefacción, ventilación y sistema de aire acondicionado (heating, ventilation, and air conditioning, HVAC) eficientes
- Uso de fuentes de energía renovables
- Materiales reciclados y de fuentes regionales
- Calidad del aire en el interior mejorada
- Sistema de agua caliente solar térmico para agua de uso doméstico para calentar el 100 por ciento del agua de uso doméstico del ala

Cambio climático y planificación para la resiliencia

Ya que el área de Boston continuará experimentando temperaturas elevadas, condiciones climáticas extremas más frecuentes y nivel del mar más elevado debido al cambio climático,[25] Massport entiende la importancia de prepararse para los impactos para proteger y mejorar su infraestructura, sus activos operativos y su mano de obra críticos. Mediante la sólida planificación y la colaboración regional, Massport se esfuerza por continuar su función de liderazgo en la planificación de la resiliencia entre las autoridades aeroportuarias, la industria aeroportuaria y la región de Boston.

A finales del 2013, Massport comenzó un *Estudio para la planificación para desastres y resiliencia de la infraestructura (Disaster and Infrastructure Resiliency Planning, DIRP)* para el Aeropuerto Logan, para el puerto de Boston, y para los recursos marítimos de Massport en el South Boston y East Boston. El estudio de DIRP incluye el análisis de los peligros, el modelado del aumento del nivel del mar y marejada ciclónica, y proyecciones de temperatura, precipitaciones y aumentos anticipados de fenómenos meteorológicos extremos. El estudio de DIRP brinda recomendaciones sobre las estrategias a corto plazo para hacer que las instalaciones de Massport sean más resilientes a los posibles efectos del cambio climático. En el 2014, el estudio se completó y se comenzó la implementación de las iniciativas de adaptación a finales del 2014.

Además del estudio de DIRP y de sus iniciativas relacionadas, Massport completó una evaluación de los riesgos con todas las autoridades de sus iniciativas de planificación estratégica, emitió una *Guía de diseño a prueba de inundaciones (Floodproofing Design Guide)* y desarrolló un marco de resiliencia para brindar mediciones congruentes para la planificación a corto y a largo plazo, y para la protección de sus instalaciones e infraestructura críticas. Más allá de la resiliencia de la infraestructura, Massport también se

25 Ciudad de Boston. 2016. *Climate Ready Boston*. https://www.boston.gov/sites/default/files/climatereadyeastbostoncharlestown_finalreport_web.pdf.

centra en la incorporación de resiliencia social y económica en su planificación operativa y de capital a largo plazo. La *Guía de diseño a prueba de inundaciones* de Massport se publicó en noviembre del 2014 y se actualizó en noviembre del 2018.

Los aspectos operativos de la estrategia de resiliencia incluyen el desarrollo de planes para el manejo de inundaciones para el Aeropuerto Logan y para las instalaciones marítimas de Massport. Estos planes se introdujeron en el 2014 e incluyeron los despliegues previstos para las barreras temporarias contra inundaciones para proteger hasta 12 ubicaciones de infraestructura crítica en caso de condiciones climáticas extremas. Se mejoraron de manera permanente ubicaciones adicionales para prevenir inundaciones. Los planes operativos para inundaciones se evalúan anualmente para mejorar su eficacia y para que se adapten a los requisitos cambiantes y en función de experiencias pasadas.

Massport informa el progreso hacia los objetivos de resiliencia en los informes de sustentabilidad anuales del Aeropuerto Logan. Se encuentra disponible información adicional sobre los objetivos y las iniciativas de resiliencia de Massport en el siguiente enlace:http://www.massport.com/massport/business/capital-improvements/sustainability/climate-change-adaptation-and-resiliency/.

Sociedades de Massport y respaldo a la comunidad

Massport tiene un compromiso que data de hace tiempo de ser un buen vecino. Al trabajar en colaboración con el gobierno, con la comunidad y con los líderes civiles en todo Massachusetts y Nueva Inglaterra, Massport participa activamente realizando esfuerzos para mejorar la calidad de vida de las personas que residen cerca de las instalaciones de Massport. Los empleados de Massport participan en numerosas actividades comunitarias. Durante la primavera, los empleados de Massport participan en la limpieza anual del vecindario Boston brilla (Boston Shines) de la ciudad de Boston. Durante la época de Acción de Gracias, los empleados de Massport donan alimentos a tres programas comunitarios, que atienden a más de 500 familias y personas todos los meses. Durante el otoño, a los niños de entre cuatro y 17 años se les entrega una mochila nueva llena de artículos escolares y ropa nueva para empezar el año escolar. Durante las vacaciones, Massport invita a los estudiantes de las comunidades vecinas y de las escuelas primarias a cantar en la Terminal A, como parte del programa anual de música de vacaciones.

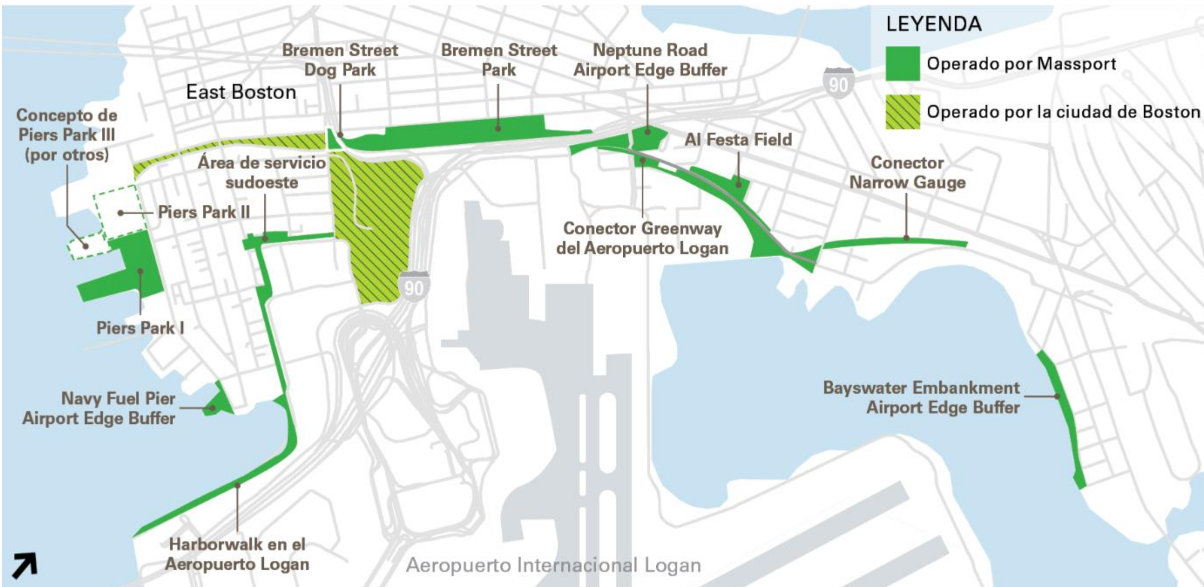
Programa de espacio abierto/amortiguación

Massport ha invertido en un amplio programa de espacio abierto para mejorar las comunidades circundantes. Massport destinó inicialmente más de USD 15 millones para la planificación, la construcción y el mantenimiento de cuatro espacios abiertos y dos parques junto al perímetro del Aeropuerto Logan. Estos amortiguadores incluyen el amortiguador Bayswater Embankment Airport Edge, el amortiguador Navy Fuel Pier y el amortiguador del área de servicios sudeste (Southwest Service Area, SWSA) (fases I y II). El premiado Piers Park se completó en 1995 y desde entonces se ha convertido en parte de una red de espacios verdes que atraviesa East Boston desde la zona costera Jeffries Point hasta Constitution Beach.

La etapa II de Piers Park, contigua al actual Piers Park, sumará 1,7 hectáreas de espacio verde a la zona costera de East Boston una vez completada y hay planes de un tercero para la etapa III de Piers Park, que transformarán un viejo muelle en un espacio verde de 1,45 hectáreas, el que incluirá características de

resiliencia para ayudar a proteger el vecindario de la inundación y del aumento del nivel del mar. Hoy, East Boston disfruta de 5,3 km y de más de 13,3 hectáreas de espacio verde desarrollado o manejado por Massport, en colaboración con la comunidad de East Boston y en respuesta a su participación. Puede obtener más información en el Capítulo 3, *Planificación aeroportuaria*.

Figura 1-11 Parques de propiedad de Massport y operados por este y la ciudad de Boston



Fuente: VHB.

Organización del *EDR del 2018/2019*

El resto de este EDR incluye lo siguiente:

- **Resumen ejecutivo en español,** que proporciona una versión traducida del Resumen ejecutivo incluido después de la versión en inglés del Capítulo 1, *Introducción/Resumen* ejecutivo.
- **Capítulo 2, *Niveles de actividad,*** que presenta estadísticas de la actividad de la aviación para el Aeropuerto Logan en el 2018 y 2019 con una comparación con años anteriores. Las mediciones de las actividades específicas analizadas incluyen pasajeros aéreos, operaciones de aeronaves, mezcla de flota y volúmenes de carga/correo.
- **Capítulo 3, *Planificación aeroportuaria*,** que brinda una descripción general de la planificación, construcción y actividades permitidas que se realizaron en el Aeropuerto Logan en el 2018 y 2019. También, describe la planificación, construcción, y actividades permitidas e iniciativas conocidas futuras.
- **Capítulo 4, *Transporte regional*,** que describe los niveles de actividades en los aeropuertos de Nueva Inglaterra en el 2018 y 2019, y actualiza las actividades de planificación regional recientes.
- **Capítulo 5, *Acceso terrestre desde y hacia el Aeropuerto Logan*,** que informa la cantidad de pasajeros en el transporte público, las calles, los volúmenes de tráfico y el estacionamiento para el 2018 y 2019 con una comparación con años anteriores.
- **Capítulo 6, *Disminución del ruido*,** en el que se actualiza el estado del entorno sonoro en el Aeropuerto Logan en el 2018 y 2019 con una comparación con los años anteriores, y describe las iniciativas de Massport para reducir los niveles de ruido.
- **Capítulo 7, *Calidad del aire/Reducción de las emisiones*,** que brinda una descripción general de la calidad del aire en relación con el Aeropuerto en el 2018 y 2019 con una comparación con los años anteriores, y las iniciativas para reducir las emisiones.
- **Capítulo 8, *Cumplimiento y manejo medioambientales/Calidad del agua*,** que describe las actividades del manejo medioambiental en curso de Massport, incluido el cumplimiento con el NPDES, los desagües pluviales, los derrames de combustible, las actividades del Plan para Contingencias de Massachusetts (MCP) y el manejo de tanques.
- **Capítulo 9, *Medidas que benefician al medioambiente y seguimiento del proyecto de mitigación***, que brinda una descripción general de los programas y de las iniciativas de Massport que proporcionan beneficios medioambientales e informa el progreso de Massport para cumplir la sección 61 de la MEPA[26] sobre los compromisos de mitigación de proyectos específicos del Aeropuerto.

26 El Capítulo 30, sección 61 (M.G.L. 30, § 61) de las leyes generales de Massachusetts establece que todas las agencias deben revisar, evaluar y determinar los impactos medioambientales de todos los proyectos o actividades, y deben usar todos los medios prácticos y mediciones para minimizar el daño al medioambiente. Para los proyectos que requieren un informe de impacto medioambiental, los hallazgos de la sección 61 especificarán todas las posibles medidas que se pueden tomar para evitar o mitigar los impactos medioambientales, y el cronograma de implementación anticipado para las medidas de mitigación.

Apéndices de la MEPA: estos incluyen la certificación del secretario para el *ESPR del 2017 y* cartas con comentarios recibidas para el *ESPR del 2017* y las respuestas a esos comentarios, certificaciones del secretario para los EDR/ESPR emitidos para los años de informe del 2011 al 2017, una lista de revisores a quienes se les distribuyó el EDR y un alcance propuesto para el *EDR del 2020*. También se incluyen en esta sección las certificaciones del secretario para el Formulario de notificación medioambiental (environmental notification form, ENF) del proyecto de modernización de la Terminal E, evaluación medioambiental (Environmental Assessment, EA)/informe de impacto medioambiental (Environmental Impact Report, EIR) provisorios y EA/EIR finales, y la certificación del secretario para el ENF del proyecto de estacionamiento del Aeropuerto Logan.

Apéndice A: Certificaciones de la MEPA y respuestas a los comentarios[27]
Apéndice B: Cartas de comentarios y respuestas
Apéndice C: Alcance propuesto para el EDR del 2020
Apéndice D: Lista de distribución

Apéndices técnicos:[28] estos incluyen datos analíticos detallados y documentación metodológica para los diferentes análisis medioambientales presentados y realizados para este EDR.

Apéndice E: Niveles de actividad
Apéndice F: Transporte regional
Apéndice G: Acceso terrestre
Apéndice H: Disminución del ruido
Apéndice I: Calidad del aire/Reducción de emisiones
Apéndice J: Cumplimiento y manejo medioambiental/Calidad del agua
Apéndice K: Informes del control de precios para el período de valores máximos
Apéndice L: Memorando de la reducción del carreteo/carreteo con un solo motor en el Aeropuerto Logan

27 Las certificaciones del secretario para el Formulario de notificación medioambiental para el proyecto de modernización de la Terminal E, EA/EIR provisorios y EA/EIR finales se incluyen el apéndice A. Por practicidad, Massport respondió a los comentarios que se relacionan con el EDR y el ESPR.

28 Los apéndice técnicos están disponibles en el sitio web de Massport en www.massport.com.

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2

Activity Levels

During 2018/2019, Boston Logan International Airport (Logan Airport or the Airport) and the aviation industry in general continued to see the strong growth experienced over the past few years. That growth was largely driven by the positive economic conditions in the Boston region, low unemployment, a strong, diverse economic base, and continued investment in commercial and residential real estate, particularly in life sciences, finance, healthcare, and higher education. The worldwide COVID-19 pandemic, which began to be felt in mid-March 2020 has, however, reversed this trend with dramatic reductions in Logan Airport passenger levels and flights. Beginning in March 2020, flights in and out of Logan Airport were dramatically reduced and passenger levels dropped by over 90 percent at the peak of the pandemic in the spring and summer of 2020. As a result, there are currently far fewer aircraft operations and passengers and a dramatic drop in overall Logan Airport activity. While activity levels began a slow recovery in mid-summer 2020, the ongoing wave of COVID-19 cases has resulted in continued historically low levels of activity, with a full recovery years away. As of October 2020, total flight operations for the year were down approximately 50 percent and passenger levels were down by about 70 percent compared to January through October 2019. Massport expects that by the end of 2020, passenger levels will have dropped to levels of activity not seen since the mid-1970s.

As of the filing of this Environmental Data Report (EDR), Logan Airport continued to be one of the nation's most impacted airports experiencing one of the most dramatic reductions in levels of activity. While the effects of COVID-19 on the aviation industry and Logan Airport continue to evolve, key updates reflecting 2020 are presented, as available. The *2020 EDR* will provide an update on the significant changes in the airline industry and Logan Airport.

Introduction

Logan Airport plays a number of critical roles in the local, New England, and national air transportation systems. It is the primary airport serving the Boston metropolitan area, the principal New England airport for long-haul services, and a major U.S. international gateway airport for transatlantic services. Logan Airport is a key transportation and economic resource in the New England region, the state, and the Boston metropolitan area, which is home to a broad range of industries.

The industries accounting for the largest share of employees include: healthcare and social assistance;[1] educational services; and professional, scientific, and technology services (which include Boston's growing

1 The Social Assistance subsector of the North American Industry Classification System includes Individual and Family Services; Community Food and Housing, and Emergency and Other Relief Services; Vocational Rehabilitation Services; and Child Day Care Services. U.S. Bureau of Labor Statistics. 2019. Industries at a Glance – Social Assistance: NAICS 624. https://www.bls.gov/iag/tgs/iag624.htm

biotech industry).[2] In 2019, Boston/Cambridge, the nation's largest biopharma cluster, committed to advancing digital health through creation of a digital health record database where the industry is expected to grow to more than $350 billion by 2025.[3] The City of Boston was also declared the "#1 city in the U.S. for fostering entrepreneurial growth and innovation" in 2017, where continued longtime strengths from top-tier universities and talent have fueled its strong startup ecosystem.[4] The contribution of innovation and business startups was also evident in the 2019 year-to-date economic growth estimates and reflected the trends in increased employment and high-tech industries.

In addition to supporting the economic success of the Commonwealth, Logan Airport and the airport industry have always been important elements in the state and regional economies. The *Massachusetts Statewide Airport Economic Impact Study Update,* completed by MassDOT in 2014 and most recently updated in 2019,[5] estimates that the three Massport airports contribute approximately $23.1 billion in output to the Massachusetts economy annually; of this output, 71 percent is due to Logan Airport alone.[6] Total output includes on-Airport businesses, construction, visitor, and multiplier effects.[7] Logan Airport supports over 162,000 direct and indirect jobs, while generating approximately $16.3 billion per year in total economic output.[8] In 2019, over 20,000 people were employed at Logan Airport. This included approximately 820 Massport Logan Airport staff and administrative employees.

This chapter reports on annual air traffic activity at Logan Airport in 2018 and 2019, including air passengers, aircraft operations, aircraft fleet mix, and cargo volumes. Air traffic and passenger activity levels at Logan Airport are the basis for the evaluation of noise, air quality effects, and ground access conditions associated with Logan Airport. In this chapter, current activity levels at the Airport are compared to prior-year levels, and historical passenger and operations trends at Logan Airport dating back to 2000 are reviewed.[9]

Where available, this EDR includes updates on 2020 activity levels that reflect the initial impacts of the COVID-19 pandemic and other changes in the aviation and travel industries. As the longer-range impact of the pandemic becomes clearer, Massport expects to be able to present updates on passenger activity and an early understanding of the anticipated recovery. The next ESPR will provide an updated activity forecast.

2 U.S. Census Bureau via DataUSA. 2019. Boston-Cambridge, Newton, MA-NH Metro Area profile. www.datausa.io

3 Massachusetts Biotechnology Council (MassBio) conference; McKinsey estimate "The Era of Exponential Improvement in Healthcare" https://www.mckinsey.com/industries/healthcare-systems-and-services/our-insights/the-era-of-exponential-improvement-in-healthcare

4 U.S. Chamber of Commerce Foundation and 1776. 2017. *Innovation That Matters*. https://www.1776.vc/reports/innovation-that-matters-2017/

5 MassDOT Aeronautics Division. 2019. *Massachusetts Statewide Airport Economic Impact Study Update*. https://www.mass.gov/files/documents/2019/03/25/AeroEcon_ImpactStudy_January2019.pdf

6 *Ibid*.

7 Multiplier effects refer to the recirculation of money in the local economy after initially being spent by the Airport, its tenants, or tourists. This recirculation increases the overall impact of the Airport's operation on the local economy.

8 MassDOT Aeronautics Division. 2019. *Massachusetts Statewide Airport Economic Impact Study Update*. https://www.mass.gov/files/documents/2019/03/25/AeroEcon_ImpactStudy_January2019.pdf

9 Refer to Appendix E, *Activity Levels,* for available information dating back to 1980.

The chapter describes 2018/2019 activity levels and historical trends for:

- Air passengers and aircraft operations at Logan Airport;
- Cargo and mail volumes at Logan Airport; and
- Airline service at Logan Airport.

Due to COVID-19, 2020 passenger levels and operations have dramatically decreased. As of October 2020, year over year passenger levels and operations were down by approximately 70 percent and 50 percent, respectively.

Source: ACI, 2018; U.S. Department of Transportation T-100 Database, 2019.

Note: A U.S. international passenger gateway refers to a U.S. port of entry for passengers traveling internationally. Logan Airport ranks 12th among other U.S. airports with international service, in terms of total number of international enplaned passengers.

Logan Airport is an important origin and destination (O&D)[10] airport both nationally and internationally and for the reporting period, had been growing on average 5.4 percent annually, ranking 20th among large hub sized U.S. airports over the past five years.[11] From 2017 to 2019, U.S. passenger traffic grew by 9.1 percent, whereas Logan Airport passenger traffic grew by 10.7 percent over the same time period. The increase in passengers and operations in 2018 and 2019 was in direct response to the strong national and regional economies during that time period. Despite the increase in passengers, aircraft operations at Logan Airport for both 2018 and 2019 remained well below the 487,996 operations in 2000 and the historical peak of 507,449 operations reached in 1998. This has been the result of a steady increase in aircraft size at the Airport and increasing aircraft load factors (passengers/available seats).[12] Historically, the number of connecting passengers has been less than 10 percent each year.

Additionally, economic and political events constantly affect the airline industry. Air traffic declines caused by economic recessions and other “shocks” such as the events of September 11, 2001 and the Great Recession in 2008/2009 have been followed by gradual recovery cycles. The airline industry has experienced significant turmoil since 2000, seeing a wave of airline bankruptcies and reorganizations and periodic increases in oil prices.

As depicted in **Figure 2-1**, after the events of September 11, 2001 and the subsequent recession, Logan Airport’s passenger activity levels declined by about 18 percent, yet recovered five years later. Logan Airport’s passenger

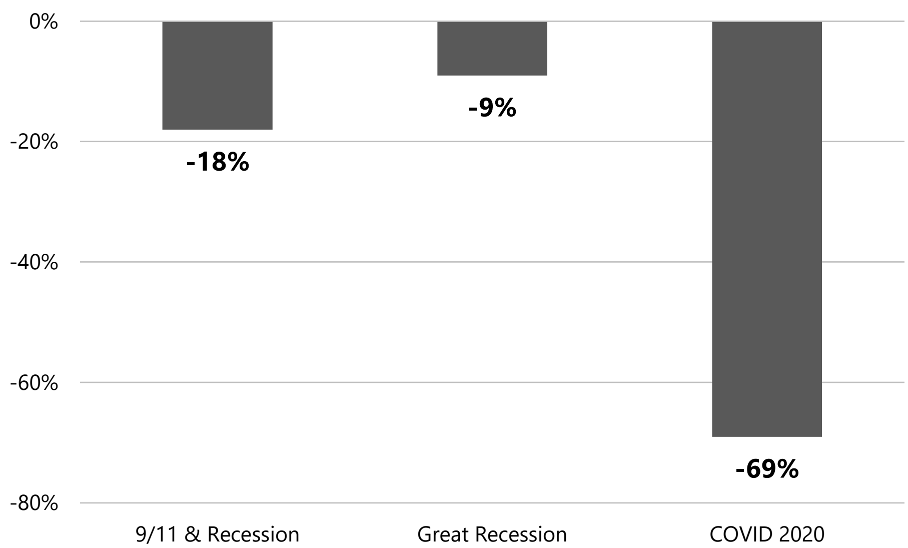
10 “Origin and destination” (O&D) traffic refers to the passenger traffic that either originates or ends at a particular airport or market. A strong O&D market like Boston generates significant local passenger demand, with many passengers starting their journey and ending their journey in that market. O&D traffic is distinct from connecting traffic, which refers to the passenger traffic that does not originate or end at the airport but merely connects through the airport en route to another destination.

11 Between 2014 and 2019, Logan Airport was the 20th fastest growing airport in the U.S. in terms of domestic O&D traffic compared to the top 30 large hub U.S. airports (U.S. Department of Transportation O&D Survey).

12 Load factor is the ratio of passengers on board to the number of available seats provided on a flight.

volumes declined by about 9 percent after the recession of 2008/2009. Recovery to pre-recession levels occurred in two years, demonstrating the resiliency of the Boston region economy.

Figure 2-1 Change to Logan Airport Passenger Growth After Recent Recessions



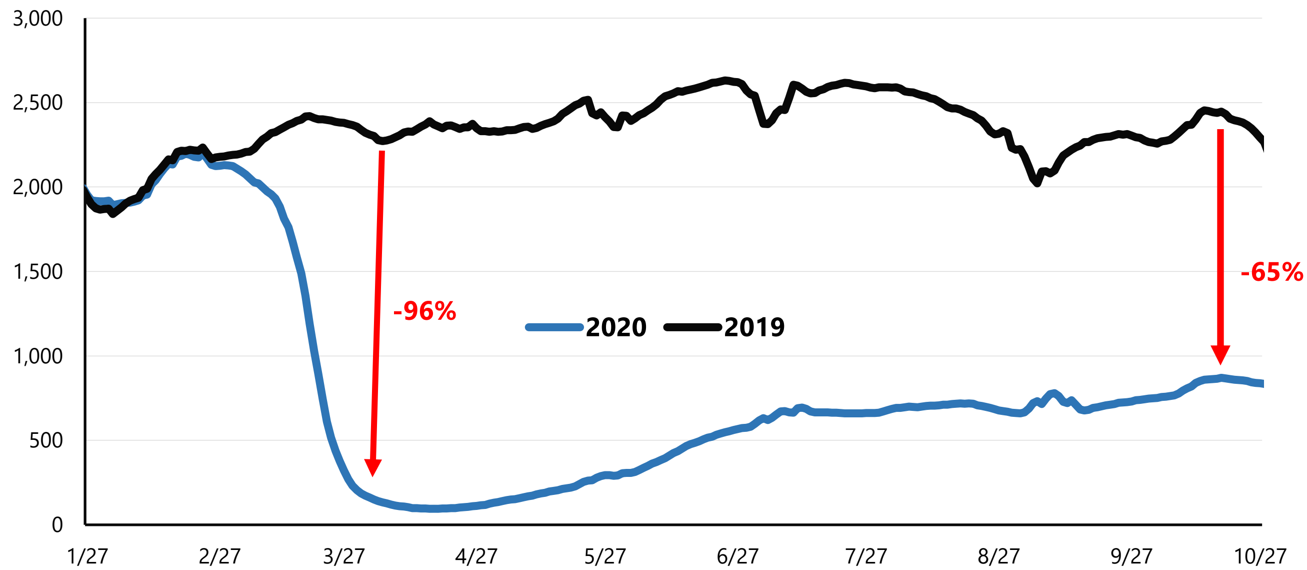
Source: InterVISTAS: Massport traffic statistics.
Note: COVID 2020 change is the year-to-date October 2020 vs. 2019.

COVID-19 Effect on the Airline Industry

COVID-19 is having an unprecedented impact on not just the aviation industry but the global economy. While the immediate and most pressing concern is human cost, COVID-19 has created profound implications for nearly all businesses and industries. The impact on aviation has been particularly severe. The situation is changing on a daily basis and there remains considerable uncertainty as to how long this outbreak will last and what will be the long-term impacts.

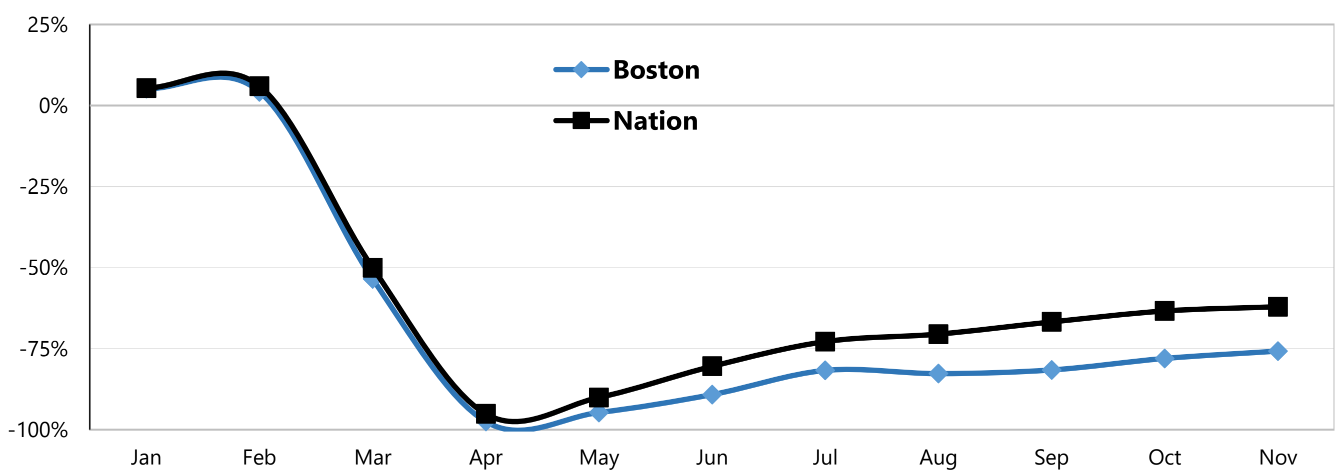
The rapid spread of COVID-19 and the related travel restrictions and social distancing measures implemented throughout the world have significantly reduced demand for air travel. After initially impacting service to China beginning in January 2020, the spread of the virus and the resulting global pandemic next affected the majority of the airline's international networks and ultimately the domestic network. Beginning in March 2020, large public events were cancelled, governmental authorities began imposing restrictions on non-essential activities, businesses suspended travel and popular leisure destinations temporarily closed to visitors. Many countries that are key Logan Airport markets have imposed bans on international travelers for specified periods or indefinitely. The dramatic decline in passengers at U.S. airports began in earnest in March 2020. As shown in **Figure 2-2**, the seven-day average Transportation Security Administration (TSA) throughput dropped by over 90 percent very quickly. TSA throughput is the number of passengers going through the TSA security screening process. **Figure-2-3** shows the percent change in monthly TSA throughput from 2019 to 2020 for the nation and Boston.

Figure 2-2: Seven Day Average TSA Throughput at U.S. Airports, 2019 vs. 2020



Source: TSA Daily Reports.

Figure 2-3: Percent Change in Monthly TSA Throughout From Prior Year, January 2020 to November 2020



Source: TSA Daily Reports.

Passenger traffic gradually began to recovery in early May 2020. But the summer recovery that was initially envisioned never materialized as the pandemic continued. It is now clear that the disruption to aviation caused by the COVID-19 pandemic could dramatically reshape the U.S. airport sector landscape, adding uncertainty and potential variability to operations, along with comparatively weaker financial performance and competitiveness. This is unlike previous downturns in severity, likely duration, effect on the rise of virtual meetings and decline of business travel, and, most notably, the tremendous industrywide transformation required to address consumer health and safety issues on a global scale.

All indications are that this precipitous decline is not a temporary disruption with a relatively rapid recovery, but rather a backdrop for what will be a period of sluggish air travel demand that could extend for a prolonged period.

The pandemic, together with the measures implemented by governmental authorities and private organizations in response to the pandemic, has had an adverse impact that has been material to airline operating results, financial conditions, and liquidity. Measures such as "shelter in place" or quarantine requirements, international and domestic travel restrictions or advisories, limitations on public gatherings, social distancing recommendations, remote work arrangements and closures of tourist destinations and attractions, as well as consumer perceptions of the safety, ease and predictability of air travel, have contributed to a precipitous decline in passenger demand and bookings for both business and leisure travel.

The airlines began experiencing a significant decline in international and domestic demand related to COVID-19 during the first quarter of 2020. The decline in demand caused a material deterioration in revenues which has lasted through the third quarter of 2020, resulting in record financial losses. The U.S. airlines combined have experienced a $36.3 billion loss for the first three quarters of 2020. Full year losses are expected to be in the range of $45 to $50 billion. The airlines have taken a number of actions in response to the decreased demand for air travel, which has resulted in mounting financial losses.

These actions include:

- Making historic capacity cuts, parking and/or retiring older aircraft (and, in some cases, entire fleet types);
- Utilizing passenger planes on cargo-only missions, either belly-only or belly and main cabin;
- Consolidating footprint at airport facilities (e.g., concourses), shuttering lounges, halting real estate projects;
- Deferring aircraft deliveries and reducing non-aircraft (e.g., ground equipment, IT) capital expenditures;
- Cutting executive compensation and implementing voluntary leave and early retirement programs; and
- Freezing hiring and non-essential spending (e.g., employee travel, consultants, events, marketing, training.

Although during the third quarter of 2020, airlines have experienced some improvement in demand, the full extent of the ongoing impact of COVID-19 on the longer-term operational and financial performance will depend on future developments, including those outside the control of the airlines, related to possible increases in COVID-19 cases and/or new quarantine requirements being imposed in certain jurisdictions or other restrictions on travel, and the distribution of a vaccine, all of which are highly uncertain.

At the end of October 2020, total flight operations at Logan Airport had dropped 63 percent compared to October 2019, and over 50 percent year-over-year. Passenger activity levels in October 2020 were down nearly 80 percent compared to October 2019, and down 70 percent comparing January to October 2020 to the same period in 2019. Logan Airport's decline in available flights and seats is one of the most severe in the United States. The Airport's ranking in the U.S. has fallen as well. In 2019, Logan Airport ranked 15th in annual passenger activity levels. In 2020, Logan Airport will likely drop to being ranked 19th.

The Northeast was hit early and hard by the pandemic. Among the other U.S. regions, the Northeast has experienced the largest decline in passenger activity levels at 49 percent. The first region to be impacted by COVID-19, the West Coast, follows with a 44-percent decline. With leisure passengers accounting for the majority of passengers traveling today, it is no surprise the Mountain region, with its wide-open spaces and Florida, with its beaches, have experienced the lowest declines.

Air Passenger Levels in 2018 and 2019

Logan Airport is the principal airport for the greater Boston metropolitan area, and the international and long-haul gateway for much of New England. Logan Airport was ranked the 16th busiest airport in the U.S. in terms of air passengers in 2018 and remained the same rank in 2019.[13] Logan Airport served 42.5 million passengers in 2019, an increase of 3.9 percent over 2018, and adding 4.1 million air passengers since 2017. This represented a high for Logan Airport, exceeding the previous record of 40.9 million in 2018. Logan Airport had been averaging an annual passenger growth of 5.9 percent since 2013, and continued to outpace the overall U.S. passenger growth of 4.1 percent per year for the same time period.[14] As a large hub airport along the U.S. eastern seaboard, Logan Airport also ranked 6th in terms of transatlantic international passengers with nearly 5.0 million passengers flying to Europe, the Middle East, and Africa in 2019, increasing by 10.3 percent compared to 2018. Factors that contributed to the Airport's strong passenger growth through 2018 and 2019 included:

- Continued economic growth and an increase in air travel demand across the nation, especially in Massachusetts and the Boston metropolitan area;
- Continued growth by air carriers jetBlue Airways' and Delta Air Lines' at Logan Airport; and
- Increasing international passenger demand and new international destinations introduced by both domestic and foreign flag carriers.

As shown in **Table 2-1**, domestic air passengers represent Logan Airport's largest market segment, accounting for approximately 81.2 and 80.2 percent of total air passengers in 2018 and 2019, respectively. The domestic passenger market increased by 6.9 percent in 2018 compared to 2017, and another 2.6 percent from 2018 to 2019. The continued economic and personal income growth of the New England region and increased need for business travel contributed to the increase in domestic passenger demand over 2018 and 2019.

Figure 2-4 shows the total annual passengers for the five major airlines at Logan Airport. Overall, the substantial low-cost carrier growth at the Airport over the past decade, particularly the entry of jetBlue Airways in 2004 and its subsequent decision to expand and make Logan Airport one of its focus cities, has exceeded recent consolidation and contraction among other carriers serving Logan Airport.[15] Through 2019, domestic passenger activity levels had recovered from the economic downturn in 2008/2009 (the Great Recession), when the total number of domestic air passengers fell to 21.8 million. In 2019, domestic passenger activity levels reached a new peak of 34.1 million.

13 Airports Council International. 2018. World Airport Traffic Report.

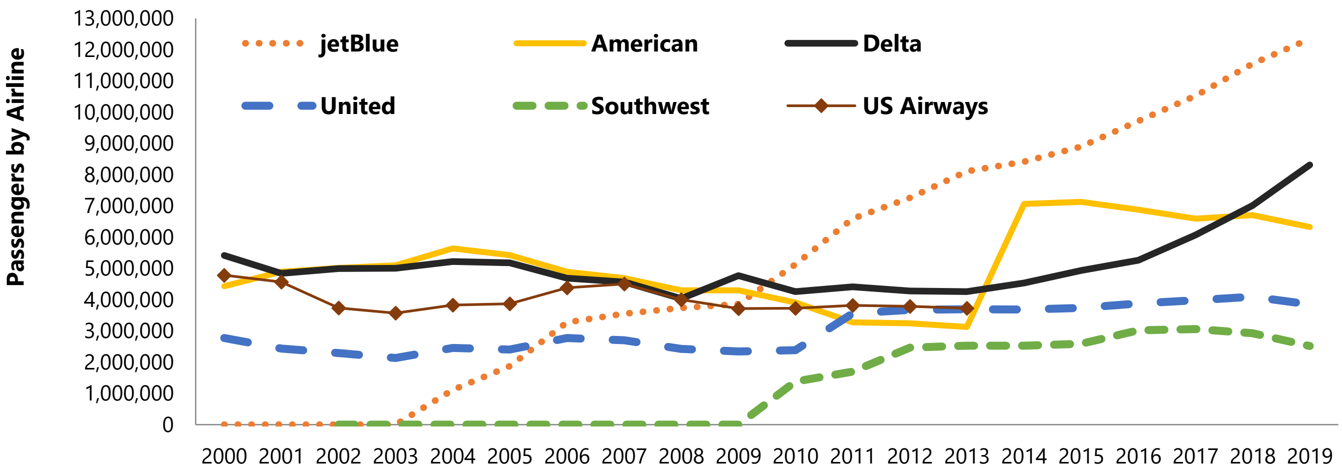
14 Bureau of Transportation Statistics. 2019.

15 Airline industry consolidation includes the merger of Delta Air Lines and Northwest Airlines in October 2008, United Airlines and Continental Airlines in August 2010, Southwest Airlines and AirTran Airways in April 2011, American Airlines and US Airways in December 2013, and Alaska Airlines and Virgin America in December 2016.

International passenger traffic at Logan Airport increased by 5.3 percent in 2018 over 2017 and 9.7 percent over 2018 levels. After three periods of decline and gradual recovery in 2001, 2006, and 2008, Logan Airport's international air passenger activity levels surpassed 2000 levels for the first time in 2013. In 2018 and 2019, international passengers comprised approximately 18.5 and 19.6 percent of total Airport passengers, respectively. Since 2013, the international air passenger segment has averaged a 10.6-percent annual growth. This increase was driven by strong market demand, resulting in the expansion of jetBlue Airways and Delta Air Lines' international service at Logan Airport, as well as a rapid increase in foreign carrier services in recent years, net international service reductions/removal from foreign flag carriers. In 2019, Boston was the 12th largest U.S. gateway for international air travel and the largest U.S. gateway airport that is not a connecting U.S. airline hub.[16] The O&D strength of the Boston market makes Logan Airport an attractive gateway for international airlines. Additional trends in new aircraft technology allowing for smaller and more fuel-efficient aircraft on international routes are also expected to continue to benefit mid-size O&D markets like Boston.

Figure 2-4 Annual Passengers at Logan Airport Served by Top Airlines, 2000–2019

Source: Massport.



Notes: US Airways totals in this chart include America West Airlines beginning in 2006 (following 2005 merger), Delta Air Lines totals include Northwest Airlines beginning in 2009 (following 2008 merger), United Airlines totals include Continental Airlines beginning in 2011 (following 2010 merger), Southwest Airlines include AirTran Airways beginning 2012 (following 2011 merger), and American Airlines includes US Airways beginning in 2014 (following 2013 merger). Totals for American Airlines, Delta Air Lines, United Airlines, and US Airways include Delta Shuttle, US Airways Shuttle, and contract carriers doing business as Delta Connection, United Express, US Airways Express, American Eagle, or American Connection.

16 U.S. Department of Transportation. 2019. T-100 Database.

Table 2-1 Air Passengers by Market Segment, 1990, 1998, 2000, 2010, and 2013-2019

	1990	1998[1]	2000	2010	2013	2014	2015	2016	2017	2018	2019	Percent Change (2018-2019)	Avg. Annual Growth (2013-2019)
Domestic	**19,519,247**	**22,429,639**	**23,100,645**	**23,688,471**	**25,578,080**	**26,545,978**	**27,810,256**	**29,591,053**	**31,100,950**	**33,245,880**	**34,098,788**	**2.6%**	**4.9%**
International	**3,358,944**	**3,985,954**	**4,513,192**	**3,681,739**	**4,546,018**	**4,992,225**	**5,534,176**	**6,587,473**	**7,199,595**	**7,583,887**	**8,317,993**	**9.7%**	**10.6%**
Europe/ Middle East/Africa[2]	N/A	2,467,585	2,948,452	2,672,635	2,901,529	3,194,109	3,473,579	4,096,114	4,360,706	4,511,543	5,003,881	10.9%	9.5%
Bermuda/ Caribbean[3]	N/A	702,383	693,620	518,088	863,842	887,301	946,428	1,032,330	1,100,769	1,103,394	1,278,045	15.8%	6.7%
Canada	N/A	790,731	833,669	486,911	643,987	669,546	688,459	878,191	1,000,634	1,054,008	985,051	(6.5%)	7.3%
Asia/Pacific	N/A	25,255	37,451[4]	0	104,235	170,867	316,621	415,869	503,386	531,030	602,004	13.4%	33.9%
Central/ South America	N/A	0	0	4,105	32,425	70,402	109,089	164,969	234,100	383,912	449,012	16.9%	55.0%
General Aviation	**N/A**	**111,115**	**112,996**	**58,752**	**94,872**	**96,242**	**105,148**	**109,516**	**111,874**	**112,158**	**105,630**	**(5.8%)**	**1.8%**
Total Passengers	**22,878,191**	**26,526,708**	**27,726,833**	**27,428,962**	**30,218,970**	**31,634,445**	**33,449,580**	**36,288,042**	**38,412,419**	**40,941,925**	**42,522,411**	**3.9%**	**5.9%**

Source: Massport.

Notes: Numbers in parentheses ( ) indicate negative numbers. Reported International passengers include only international passengers using Logan Airport as an international gateway; a significant number of international O&D passengers also board domestic flights from Logan Airport to connect to other U.S. gateways to international destinations. Avg. Annual Growth rates calculate compound annual growth (CAGR)

N/A Not available.

1 1998 represents the historical peak in terms of aircraft operations for Logan Airport with 507,449 operations.

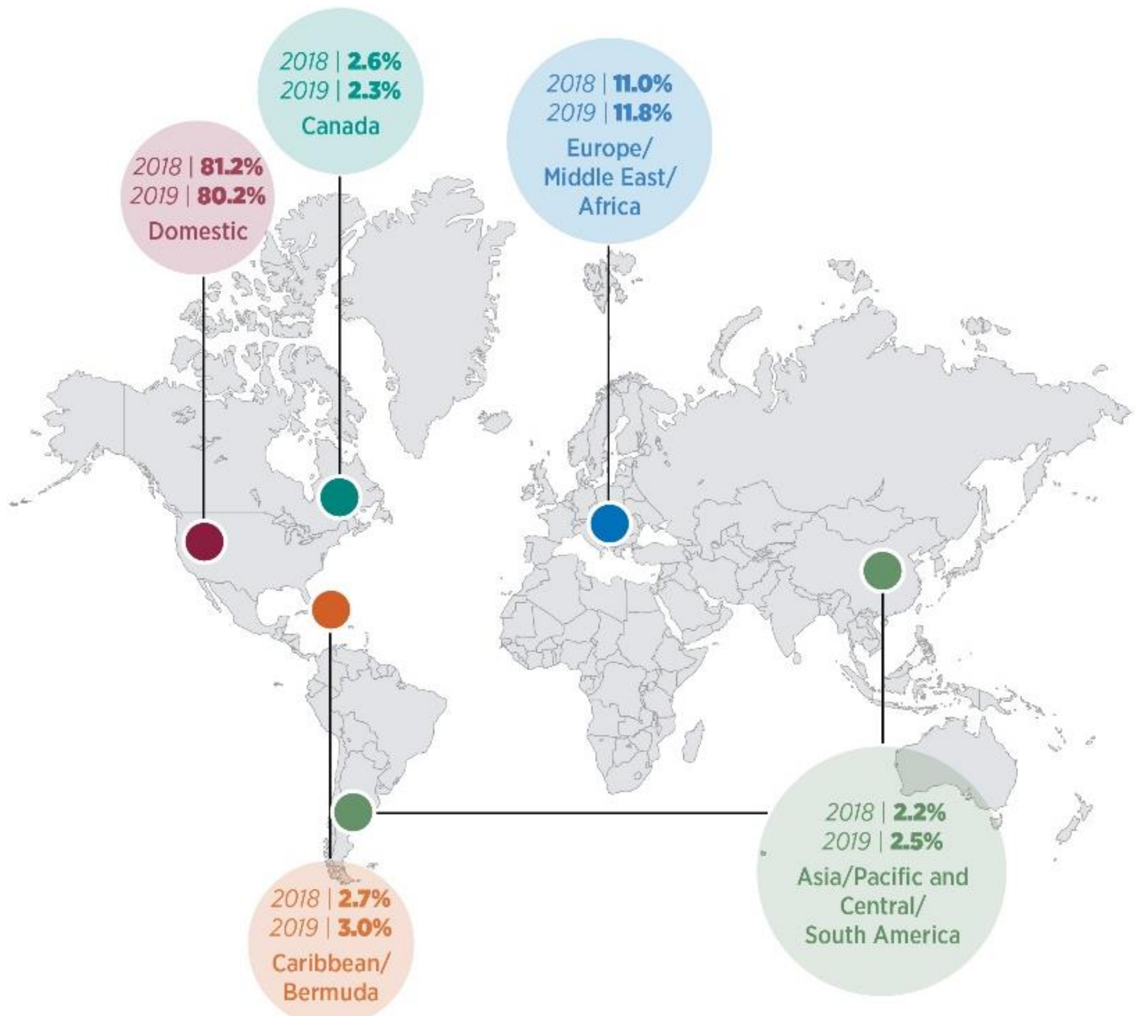
2 Royal Air Maroc commenced service to Casablanca, Morocco (North Africa) in June 2019.

3 Includes Puerto Rico and U.S. Virgin Islands.

4 Between 1996 and 2001, Korean Air served Logan Airport with one-stop service via New York John F. Kennedy and Washington Dulles; this service was discontinued in February 2001. However, eighteen years later, starting in May 2019, Korean Air re-commenced service out of Boston with a direct connection to Seoul-Incheon on their new B787 Dreamliner.

Figure 2-5 shows the distribution of Logan Airport passengers by market segment. Europe/Middle East/Africa was the dominant international destination market, accounting for 60.2 percent of international traffic and 11.8 percent of total traffic at Logan Airport. Passenger traffic to Europe/Middle East/Africa was up 10.9 percent in 2019, driven by added capacity to Europe and other destinations by several European carriers and Delta Air Lines. The Bermuda/Caribbean regions and Canada accounted for 15.4 percent and 11.8 percent of international passengers in 2019, respectively, with passenger traffic to Bermuda/Caribbean increasing 15.8 percent and passenger traffic to Canada declining 6.5 percent. Asia/Pacific and Central/South America passenger traffic accounted for 7.2 percent and 5.4 percent of international passengers in 2019, respectively.

Figure 2-5 Distribution of Logan Airport Passengers by Market Segment, 2018-2019



Source: Massport.
Note: General aviation accounted for 0.2% of Logan Airport passengers in 2019.

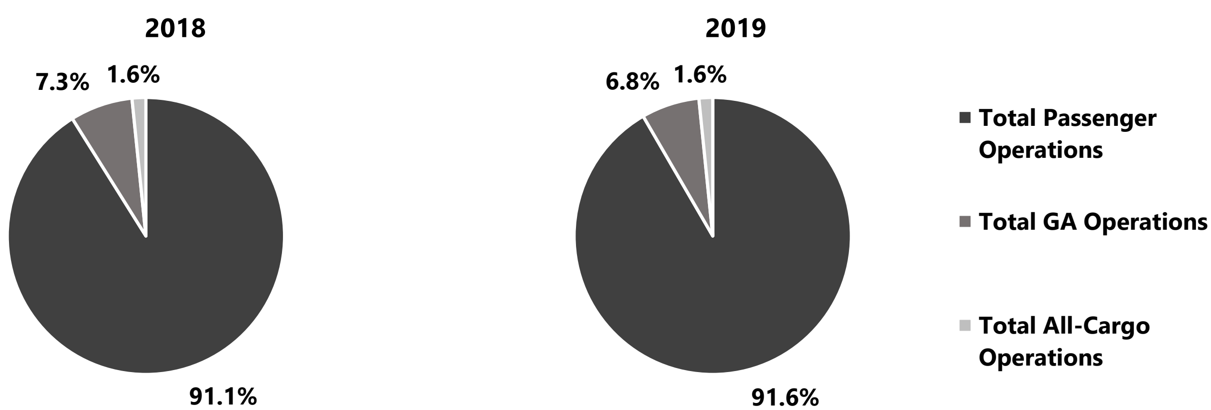
Aircraft Operation Levels in 2018 and 2019

This section reports on aircraft operations levels for Logan Airport, including passenger aircraft operations, General Aviation (GA) operations, all-cargo aircraft operations, and aircraft load factors in 2018 and 2019.

Logan Airport Aircraft Operations

The total number of aircraft operations at Logan Airport increased by 5.6 percent, from 401,371 operations in 2017, to 424,024 operations in 2018. Operations increased by 0.7 percent in 2019 to 427,176 operations (**Table 2-2**). Increases were seen in passenger and all-cargo operations in both 2018 and 2019 compared to the previous year, as airlines respond to passenger demand growth with both additional frequencies to existing markets and introducing non-stop services to new markets. In 2018, passenger operations grew 6.3 percent from 2017 due to an increase in regional jet (RJ) operations of 19.5 percent (an additional 7,648 flights), coming specifically from domestic short/medium haul routes served by mainline carrier regional affiliates (e.g., Delta Connection). In 2019, passenger operations increased at a slower rate of 1.3 percent from 2018. GA activity, on the other hand, has diminished at Logan Airport since 2017, declining by 0.6 and 6.5 percent in 2018 and 2019, respectively, because GA operations shifted to smaller, lower-cost facilities outside of Boston (i.e. Hanscom, Worcester, etc.). As shown in **Figure 2-6**, passenger operations in 2019 accounted for 91.6 percent of total aircraft operations at Logan Airport an increase of 0.5 percent from its 2018 share of 91.1 percent, while GA and all-cargo operations accounted for 6.8 percent and 1.6 percent, respectively. GA operations share shrunk slightly from its 2018 level of 7.3 percent whereas all-cargo operations remained unchanged. Although Logan Airport saw limited growth in total movements between 2018 and 2019, increasing by 3,152 operations, the attributed growth in passenger operations and aviation demand was primarily driven by the increased economic activity and welfare of New Englanders that use the Airport. **Figure 2-7** depicts passenger levels and aircraft operations since 1990 and shows a historical trend of increasing passenger levels and operations increasing, though not as rapidly as passenger activity levels. From 2001 to 2019, the annual number of passengers at Logan Airport increased by 73.7 percent, while the annual number of aircraft operations decreased by 7.8 percent, demonstrating the trend of increasing aircraft load factors by air carriers.

Figure 2-6 Logan Airport 2018 and 2019 Aircraft Operations by Type



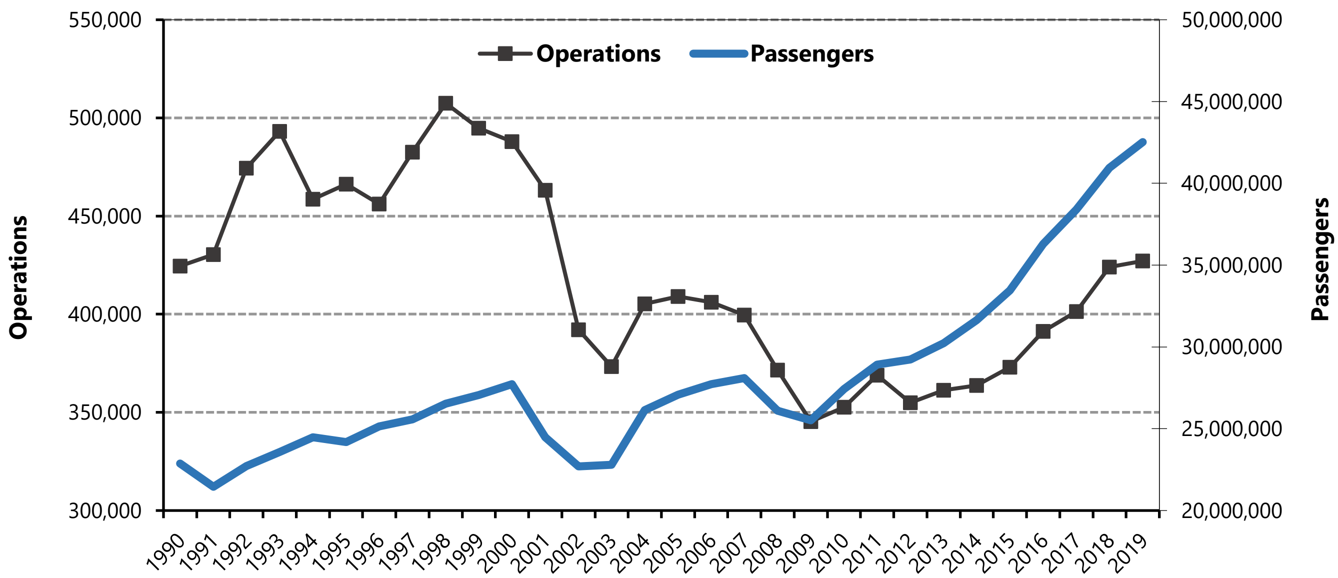
Source: Massport

Table 2-2 Logan Airport Aircraft Operations (1990, 1998, 2000, 2010, and 2013–2019)

Category	1990	1998[1]	2000	2010	2013	2014	2015	2016	2017	2018	2019	Percent Change (2018-2019)	Avg. Annual Growth (2013-2019)
Total Aircraft Operations	**424,568**	**507,449**	**487,996**	**352,643**	**361,339**	**363,797**	**372,930**	**391,222**	**401,371**	**424,024**	**427,176**	**0.7%**	**2.8%**
Operations by Type and Aircraft Class													
Passenger Jet	N/A	242,927	254,968	214,307	233,072	240,252	254,250	270,330	279,464	292,636	296,514	1.3%	4.1%
Passenger Regional Jet	N/A	12,087	37,600	66,498	47,875	44,079	38,229	36,564	39,279	46,927	49,417	5.3%	0.5%
Passenger Non-Jet	N/A	209,665	147,913	50,882	48,307	47,339	46,225	46,868	44,764	46,708	45,492	(2.6%)	(1.0%)
Total Passenger Operations	**N/A**	**464,679**	**440,481**	**331,687**	**329,254**	**331,670**	**338,705**	**353,762**	**363,507**	**386,270**	**391,424**	**1.3%**	**2.9%**
GA Jet Operations	N/A	13,636	20,595	11,430	21,237	21,025	20,589	24,499	24,769	20,092	19,328	(3.8%)	(1.6%)
GA Non-Jet Operations	N/A	18,076	14,638	3,252	5,445	5,391	7,577	6,281	6,351	10,848	9,594	(11.6%)	9.9%
Total GA Operations	**24,976**	**31,712**	**35,233**	**14,682**	**26,682**	**26,416**	**28,166**	**30,780**	**31,120**	**30,940**	**28,922**	**(6.5%)**	**1.4%**
Cargo Jet	N/A	10,428	11,788	5,332	4,647	4,911	5,605	5,745	5,800	6,392	6,402	0.2%	5.5%
Cargo Non-Jet	N/A	630	494	942	756	800	454	935	944	422	428	1.5%	(9.1%)
Total All-Cargo Operations	**N/A**	**11,058**	**12,282**	**6,274**	**5,403**	**5,711**	**6,059**	**6,680**	**6,744**	**6,814**	**6,830**	**0.2%**	**4.0%**

Source: Massport.
Notes: Jet includes the Embraer E-190, which is a regional jet configured with 88 to 100 seats but similar in size to some traditional narrow-body jets.
Numbers in parentheses ( ) indicate negative numbers. Avg. Annual Growth rates calculate compound annual growth (CAGR)
N/A Not Available.
1 1998 represents the historical peak in terms of aircraft operations for Logan Airport.

Figure 2-7 Logan Airport Annual Passenger Levels and Aircraft Operations (1990–2019)



Source: Massport.

Due to COVID-19, 2020 passenger levels and operations have dramatically decreased. As of October 2020, year over year passenger levels and operations are down by approximately 70 percent and 50 percent, respectively.

Passenger Aircraft Operations

Logan Airport had 386,270 and 391,424 passenger aircraft operations in 2018 and 2019, respectively, increasing by 6.3 percent from 2017 and another 1.3 percent from 2018. jetBlue Airways, Delta Air Lines, American Airlines, Cape Air, United Airlines and Southwest Airlines accounted for the majority of aircraft operations in 2018 and 2019.[17]

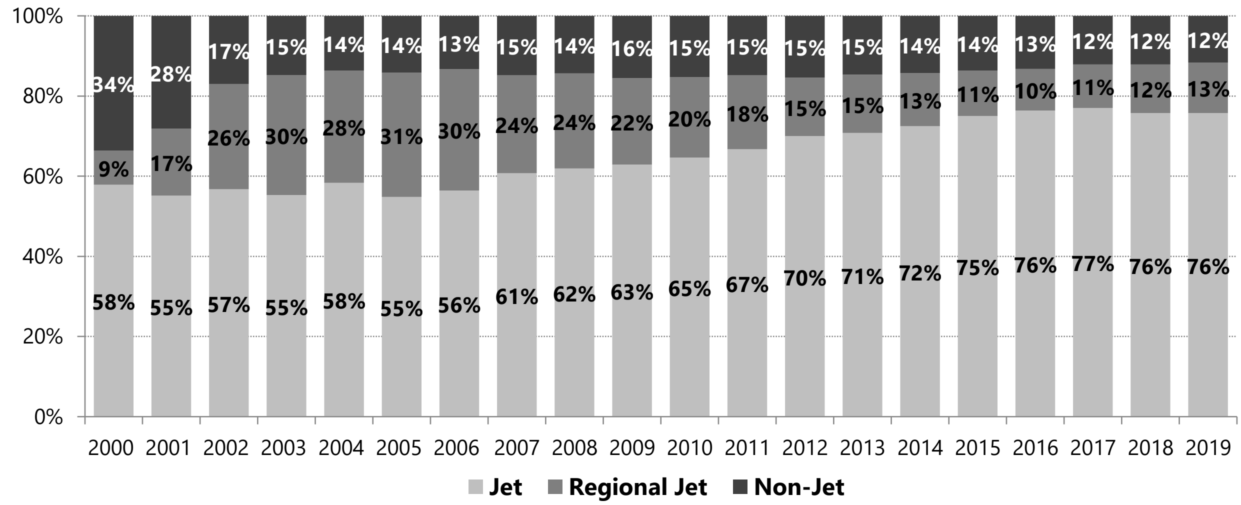
Table 2-2 shows year-over-year changes in passenger RJ, non-jet passenger, and passenger jet operations. RJ operations, which are jet aircraft with fewer than 90 seats, increased significantly by 19.5 percent in 2018 to 46,927 operations and rose again by 5.3 percent in 2019.[18] Up until 2016, RJ operations had been declining steadily since 2006, as airlines eliminated unprofitable services to small and medium size markets and consolidated services after a period of airline mergers. However, in the past three years, RJ operations increased by 35.2 percent over 2016 levels due to low fuel prices, resulting in mainline carrier's regional affiliates to increase use of RJs on select routes.

17 Aircraft operation numbers for airlines include regional partners and subsidiaries.

18 In this report, the term regional jet refers to small jet aircraft with fewer than 90 seats. The Embraer-190, operated by jetBlue Airways at Logan Airport, carries up to 100 passengers and is considered a jet.

The change in mix of passenger aircraft operations since 2000 is shown in **Figure 2-8**. RJs accounted for 13 percent of total passenger operations in 2019, compared to 31 percent at the peak level in 2005. Similarly, non-jets operations have declined from 34 percent in 2000 to 12 percent in 2019.

Figure 2-8 Passenger Aircraft Operations at Logan Airport by Aircraft Type, 2000-2019



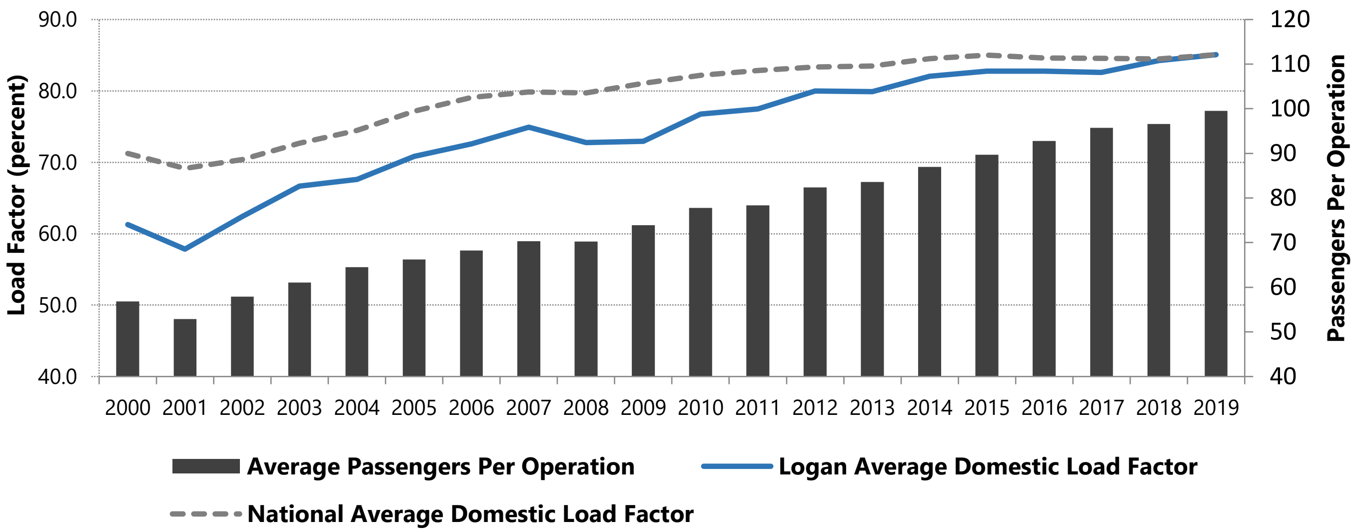
Source: Massport.
Notes: Jet includes the Embraer E-190, which is a regional jet configured with 88 to 100 seats but is similar in size to some traditional narrow body jets.

Passengers per Aircraft and Load Factors

The average number of passengers per aircraft operation increased in 2018 and 2019, continuing the long-term trend of greater efficiency. An increase in the average number of passengers per aircraft operation indicates an increase in the average aircraft seating capacity and/or an increase in the percentage of aircraft seats occupied by passengers (i.e., load factor[19]). Changes in the number of passengers per operation and load factors at Logan Airport are shown in **Figure 2-9**. In 2019, Logan Airport operations accommodated an average of 99.5 passengers per flight compared to 96.6 in 2018 and 95.7 in 2017 (**Table 2-3**), which is the highest average in the last decade. This increase in 2018 and 2019 is attributed by the introduction of newer and larger aircraft like the Airbus 350 and Boeing 787 at Logan Airport, especially for international long-haul flights to both existing and new destinations in 2018 and 2019. The average number of passengers per flight has risen by 27.9 percent since 2010 when the average number of passengers per flight was 77.8. The trend of reducing costs by supporting more passengers on fewer flights is more efficient, reflecting a shift away from smaller, less fuel-efficient aircraft and rising load factors as airlines carefully monitor and restrict capacity growth. In 2019, Logan Airport's average domestic load factor was 85.1 percent, up from 2018 levels of 84.2 percent and 2017 levels of 82.6 percent. The national average domestic load factor increased during the same period, from 81.8 percent in 2017 to 84.4 percent in 2018 and 85.1 percent in 2019.[20]

19 The number of passengers as a percentage of total seats operated at the airport.
20 U.S. Department of Transportation. 2017. T-100 Database; includes scheduled passenger service only.

Figure 2-9 Passengers per Aircraft Operation and Aircraft Load Factors (2000-2019)



Source: Massport; U.S. Department of Transportation, T-100 Database.
Notes: Includes scheduled passenger service only.

Table 2-3 Air Passengers and Aircraft Operations, 2000, 2010-2019

Year	Air Passengers	Percent Change from Previous Year	Aircraft Operations	Percent Change from Previous Year	Average Number of Passengers per Operation	Net Change from Previous Year (No. Pass/Op.)	Logan Airport Average Domestic Load Factor	Net Change from Previous Year (Pct. Points)
2000	27,726,833	2.5%	487,996	(1.4%)	56.8	2.1	61.3%	0.4
2010	27,428,962	7.5%	352,643	2.1%	77.8	3.9	76.8%	3.8
2013	30,218,631	3.4%	361,339	1.8%	83.6	1.2	79.9%	(0.1)
2014	31,634,445	4.7%	363,797	0.7%	87.0	3.4	82.1%	2.2
2015	33,449,580	5.7%	372,930	2.5%	89.7	2.7	82.8%	0.7
2016	36,288,042	8.5%	391,222	4.9%	92.8	3.1	82.8%	0.0
2017	38,412,419	5.9%	401,371	2.6%	95.7	2.9	82.6%	(0.2)
2018	40,941,925	6.6%	424,024	5.6%	96.6	0.9	84.2%	1.6
2019	42,522,411	3.9%	427,176	0.7%	99.5	3.0	85.1%	0.8

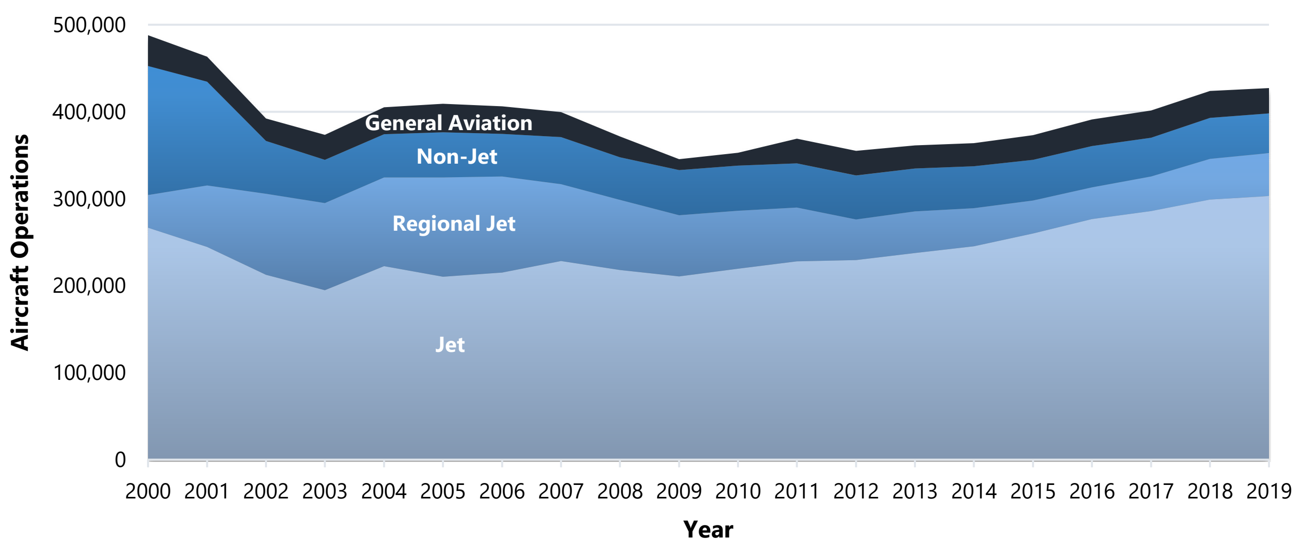
Source: Massport; U.S. Department of Transportation, T-100 Database.
Notes: Numbers in parentheses ( ) indicate negative numbers.
Includes scheduled passenger service only.
Refer to Appendix E, *Activity Levels,* for additional passenger and operations data dating back to 1980.

General Aviation Operations

GA is defined as all aviation activity other than commercial airline and military operations. It encompasses a variety of aviation activities at Logan Airport, including corporate/business aviation, private business jet charters, law-enforcement, and emergency medical/air ambulance services. GA operations are conducted by a diverse group of private and business aviation aircraft ranging from single-engine piston driven aircraft to high-performance, long-range jets. GA activity at Logan Airport declined following the 2008/2009 economic recession but recovered in 2011. Lower oil prices and decreased fuel expenses over the past two years have contributed to an increase in GA activity at Logan Airport. GA operation levels in 2017 remained well below the 35,233 GA operations that Logan Airport handled in 2000. In 2018 and 2019, GA operations at Logan Airport totaled 30,940 and 28,922, respectively, which represents an annual year-over-year decline of 0.6 percent from the 31,120 movements in 2017, and a further decline of 6.5 percent from 2018.

Table 2-2 shows year-over-year changes in GA operations. Hanscom Field remains the primary GA airport for the Greater Boston region, accommodating over four times the number of GA operations at Logan Airport. Hanscom Field accommodated 120,945 and 127,755 GA operations in 2018 and 2019, respectively, representing greater than 99 percent of Hanscom Field's aircraft activity **Figure 2-10** depicts changes in the number of Logan Airport aircraft operations by category since 2000.

Figure 2-10 Aircraft Operations at Logan Airport by Aircraft Class, 2000-2019



Source: Massport.
Notes: Jet, regional jet, and non-jet operations are associated with commercial passenger and all-cargo airlines.
GA operations also include jet and non-jet aircraft but are associated with private charter and corporate use.

All-Cargo Operations

Operations by cargo-dedicated aircraft represent less than 2 percent of aircraft activity at Logan Airport. **Table 2-2** shows year-over-year changes in all-cargo operations. All-cargo carriers at Logan Airport include FedEx, UPS, DHL, and a few other smaller carriers.

Airline Passenger Service in 2018 and 2019

Airlines can adjust service at an airport or on a specific route in two ways: changing the number of flights operated or changing the size of the aircraft. Changes in flight frequency and changes in aircraft size both affect the number of seats available to passengers (seat capacity). Airline services are therefore typically discussed in terms of seat capacity as well as the number of flight departures.[21] This section examines changes in airline departures and seat capacity at Logan Airport in 2018 and 2019 and provides an overview of new and discontinued routes.

Service Developments at Logan Airport

In 2018, 46 airlines provided scheduled passenger service from Logan Airport to 134 non-stop destinations, whereas in 2019, 48 airlines offered scheduled passenger service to 141 global destinations.[22] The average non-stop stage length (the average length of non-stop flights) of scheduled domestic flights from Logan Airport increased from 988 miles in 2017 to 1,076 miles in 2018 and to 1,093 miles in 2019. The average non-stop stage length of scheduled international flights also increased in 2019 versus 2018, from 3,119 miles to 3,233 miles given new connections over both the Atlantic and Pacific Oceans. The major changes in Logan Airport's scheduled passenger services in 2018 and 2019 are described below.

Changes in Domestic Passenger Service

The total number of scheduled domestic flights at Logan Airport in 2018 increased by 6.9 percent compared to 2017 and rose another 1.3 percent between 2018 and 2019 for a total of 336,938 operations. Overall, scheduled jet operations by legacy carriers and low-cost carriers increased by 6.3 percent in 2018, while regional/commuter flights also increased by 8.7 percent after seeing limited growth of 0.8 percent in 2017. In 2019, low-cost carriers continued to grow steadily as has been the trend the last six years with 1.6 percent average annual growth in scheduled domestic operations while legacy domestic service shrunk by a small margin of 0.2 percent. **Table 2-4** shows year-over-year changes in domestic air passenger operations. Key changes in 2018/2019 include:

- **Decrease in Legacy Carrier Service.** Although legacy carrier jet operations saw an increase of 12.3 percent in 2018 over 2017 levels, it declined in 2019 by 2.2 percent compared to 2018.

21 A departure is an aircraft take-off at an airport. While aircraft operations include both departures and arrivals, airline services are typically described in terms of departures, as the number of scheduled departures generally equals the number of scheduled arrivals. Changes in departures translate to changes in overall operations.

22 Based on Innovata SRS schedules. The merger between Alaska Airlines and Virgin America was approved by the U.S. Department of Justice in December 2016. The airline began to operate under the Alaska Airlines name in 2018.

- **Continued increase in Low-Cost Carrier Service.** Low-cost carriers accounted for over 40 percent of Logan Airport's total scheduled domestic operations in both 2018 and 2019.[23]
- **Increase in Regional/Commuter Service.** Regional commuter flights increased significantly in both 2018 and 2019 by 8.7 percent and 6.6 percent, respectively, due to increased operations by Republic Airlines (American Airlines, Delta Air Lines, and United Airlines regional affiliates), SkyWest Airlines (Delta Air Lines), and Piedmont Airlines (American Airlines regional affiliate).

A complete listing of all changes in scheduled departures by domestic destination is in Appendix E, *Activity Levels*. Logan Airport's scheduled domestic large jet and domestic regional services are illustrated in **Figures 2-11** and **2-12**.

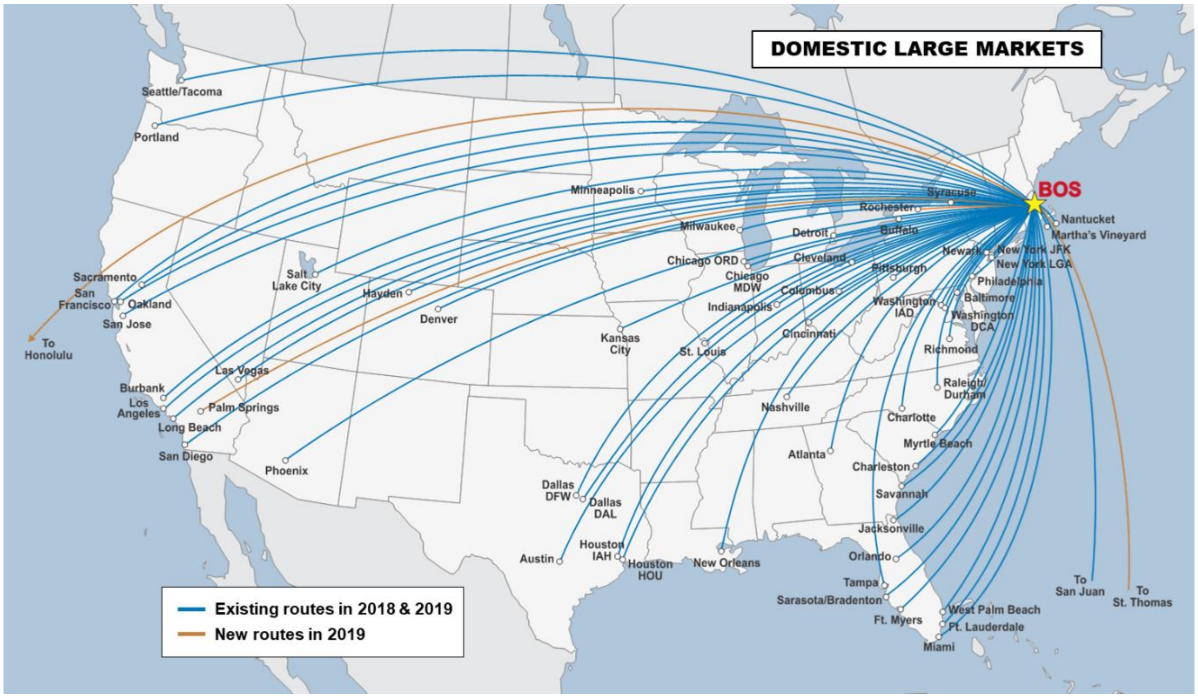
Table 2-4 Scheduled Domestic Air Passenger Operations by Airline Category, 2000, 2010, 2013-2019

Category	2000	2010	2013	2014	2015	2016	2017	2018	2019	Percent change 2018-2019	Avg. Annual Growth (2013-2019)
Scheduled Jet Carriers	**233,993**	**203,081**	**211,176**	**214,854**	**225,629**	**235,381**	**242,404**	**257,795**	**257,202**	**(0.2%)**	**3.3%**
Legacy Carriers[1]	222,564	117,877	107,162	109,470	114,987	114,012	110,790	124,396	121,675	(2.2%)	2.1%
Low-Cost Carriers[2]	11,429	85,204	104,014	105,384	110,642	121,369	131,614	133,399	135,527	1.6%	4.5%
Regional/ Commuter	160,041	94,535	79,922	76,682	70,274	68,204	68,753	74,766	79,736	6.6%	(0.0%)
Total Scheduled Domestic	**394,034**	**297,616**	**291,098**	**291,536**	**295,903**	**303,585**	**311,157**	**332,561**	**336,938**	**1.3%**	**2.5%**

Source: Massport.
Notes: Numbers in parentheses ( ) indicate negative numbers. Avg. Annual Growth rates calculate compound annual growth (CAGR).
1 Includes legacy carrier large jet operations only; regional jet and non-jet operations operated by regional affiliates or subsidiaries of legacy carriers are included in the "Regional/Commuter" category.
2 Low-cost carriers that provided domestic service at Logan Airport in 2018 and 2019 included jetBlue Airways, Southwest Airlines, Spirit Airlines, Virgin America, Sun Country Airlines, and Frontier Airlines.

23 Southwest Airlines decreased domestic operations by 14.2 percent from 23,191 operations in 2018 to 19,907 operations in 2019.

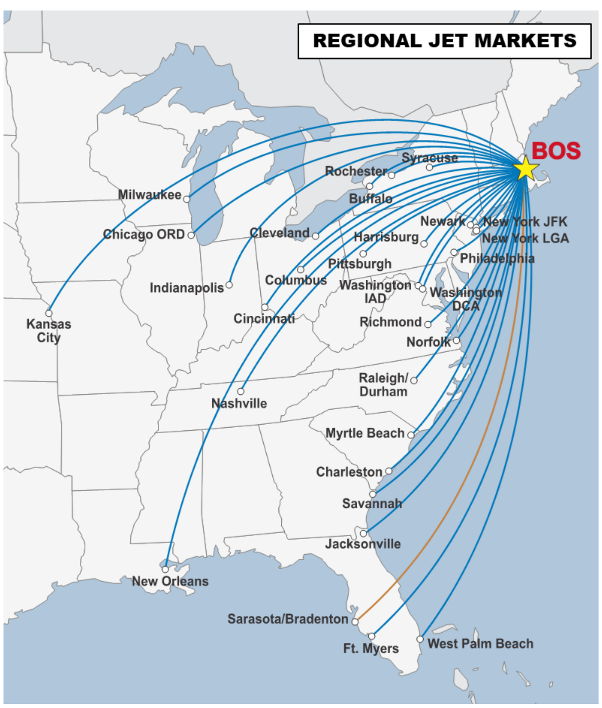
Figure 2-11 Domestic Non-Stop Large Jet Markets Served from Logan Airport, 2019

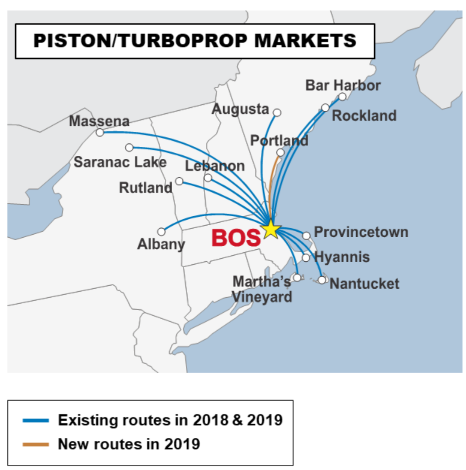


Source: Innovata Schedules via Diio by Cirium.

Note: There were three new domestic non-stop large jet routes in 2019, to: Honolulu, Palm Springs, and St. Thomas Virgin Islands.

Figure 2-12 Domestic Non-Stop Regional Jet and Non-Jet Markets Served from Logan Airport, 2019





Source: Innovata Schedules via Diio by Cirium.

Changes in International Passenger Service

Total scheduled international passenger operations at Logan Airport grew by 3.0 percent in 2018 and 1.5 percent in 2019. There were 54,468 scheduled international passenger operations at Logan Airport in 2019, up from 53,664 operations in 2018, and 52,119 operations in 2017, as summarized in **Table 2-5** (for details on the changes in operations by carrier, see Appendix E, *Activity Levels*). Starting in 2019, Europe alone represents Logan Airport's largest international destination region in terms of aircraft operations, accounting for approximately 36.5 percent of total scheduled international passenger operations in 2019 with 19,904 scheduled passenger operations. **Table 2-5** shows year-over-year changes in scheduled international passenger operations by market segment. In 2019, passenger operations to Asia had the largest increase in operations, followed by Bermuda/Caribbean. In 2018, Central/South America had the largest increase in passenger operations due to new and additional non-stop services offered by foreign flag carriers. Overall, Logan Airport served 59 non-stop international destinations in 2019, compared to 55 in both 2017 and 2018.[24]

Table 2-5 Scheduled International Passenger Operations by Market Segment, 2000, 2010, 2013-2019

Category	2000	2010	2013	2014	2015	2016	2017	2018	2019	Percent change 2018-2019	Avg. Annual Growth (2013-2019),
Canada	26,067	16,399	16,125	15,748	15,801	17,929	18,590	19,204	17,074	(11.1%)	1.0%
Europe/Middle East/North Africa	13,345	12,750	13,530	14,868	16,251	20,099	20,595	20,169	21,590	7.0%	8.1%
Bermuda/Caribbean[1]	3,205	4,116	7,031	7,428	7,584	8,339	8,690	8,702	9,682	11.3%	5.5%
Asia	0	0	646	1,011	1,751	2,156	2,415	2,513	2,854	13.6%	28.1%
Central/South America	314	0	347	730	991	1,433	1,829	3,076	3,268	6.2%	45.3%
Total Scheduled International	**42,931**	**33,265**	**37,679**	**39,785**	**42,378**	**49,956**	**52,119**	**53,664**	**54,468**	**1.5%**	**6.3%**

Source: Massport.
Notes: Numbers in parentheses ( ) indicate negative numbers. Avg. Annual Growth rates calculate compound annual growth (CAGR).
N/A Not Available.
1 Includes Puerto Rico and U.S. Virgin Islands.

Changes in international service at Logan Airport in 2018 and 2019 included continued growth of foreign carrier service across both the Atlantic and Pacific Oceans. Logan Airport has seen a rapid increase in international service in recent years, with a number of new foreign carriers entering the market. Logan Airport's scheduled international air service markets are shown in **Figure 2-13**.

24 International Air Transport Association (IATA) Innovata Schedules

Figure 2-13 International Non-Stop Markets Served from Logan Airport, 2019

Source: Innovata Schedules via Diio by Cirium.

Note: LEVEL Air opened up non-stop services to Barcelona in March 2018; LATAM commenced Sao Paulo service in June 2018. Avianca commenced non-stop service to its Central American hub in San Salvador in August 2018, however suspended after May 2019. jetBlue suspended seasonal services to St. Maarten in 2018 due to impact of Hurricane Irma to the island, but re-commenced service in February 2019.

Cargo Activity Levels in 2018 and 2019

In 2018 and 2019, Logan Airport ranked 21st among U.S. airports in total air cargo volume.[25] Total air cargo volume[26] at Logan Airport increased to over 735 million pounds in 2018, compared to 708 million pounds in 2017, however declined by 2.5 percent the following year in 2019 to 717 million pounds. Altogether, total cargo volumes today represent nearly 68 percent of the cargo volume level seen in 2000, having transported over 1.0 billion pounds then. Air cargo is carried either in the belly compartments of passenger aircraft or by dedicated all-cargo carriers such as FedEx, UPS, and DHL in all-cargo aircraft. The express/small package segment continued to dominate Logan Airport cargo activity, accounting for 56.3 and 57.4 percent of the total non-mail cargo volumes in 2018 and 2019, respectively.

Table 2-6 shows all-cargo aircraft operations and cargo volumes at Logan Airport for 1990, 2000, and 2010 to 2018 and 2019. In 2018, the number of all-cargo aircraft operations at Logan Airport increased by 1.0 percent compared to 2017 while total cargo volume, including mail, increased 3.8 percent, reflecting an industrywide trend of growth in all-cargo segments: heavyweight, small package, e-commerce, and mail starting in 2017. Whereas in 2019, total volume declined by 2.5 percent, all-cargo aircraft movements rose slightly by 0.2 percent compared to 2018 activity levels.

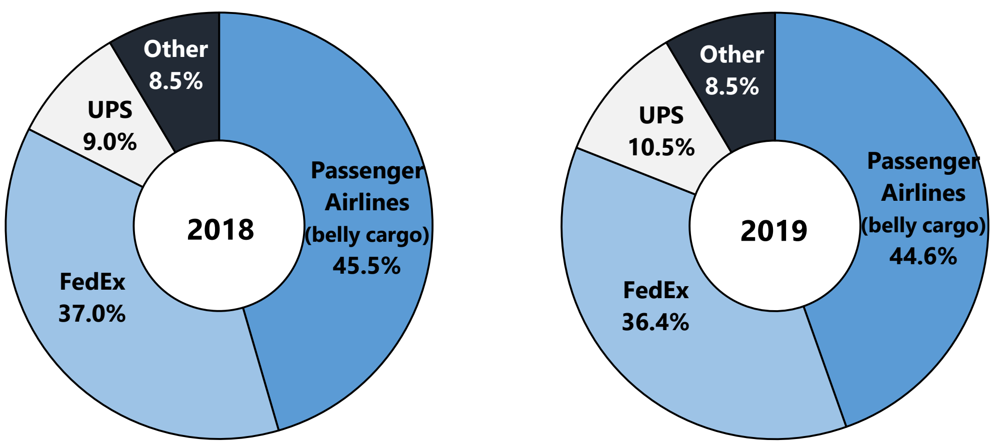
25 U.S. Department of Transportation. T-100 Database. Total cargo volume includes mail.

26 Air cargo includes express/small packages, freight, and mail.

Compared to 2000, all-cargo operations during 2019 at Logan Airport have declined by 44.4 percent, while total cargo volume has declined by 31.5 percent. Several factors are responsible for the decline over the last two decades in cargo shipments (including freight, express, and non-express mail and packages) at Logan Airport, as well as nationally. Cargo carriers, particularly the integrators that provide door-to-door delivery services, have significantly increased their use of trucks to move cargo in shorter-haul markets because it is more cost-effective than air transport. In addition, the widespread acceptance and use of the internet and e-mail has greatly reduced mail volumes overall.

FedEx was the largest air carrier by cargo volume carried through Logan Airport in 2018 and 2019, transporting over 261 and 272 million pounds[27] (representing 37.0 and 36.4 percent of Logan Airport's cargo volume), respectively. FedEx was the 16th largest air carrier at the Airport in terms of total flights in 2019, dropping down by one rank compared to 2018.[28] UPS was the next largest cargo operator and accounted for 10.5 percent of Logan Airport's cargo volume in 2019. Passenger airlines carried the greatest share of 44.6 percent, or 319.8 million pounds, of Logan Airport's cargo as belly cargo in 2019, compared to 397.6 million pounds that were shipped on all-cargo carriers (see **Figure 2-14)**.

Figure 2-14 Cargo Carriers – Share of Logan Airport Cargo Volume, 2018 and 2019



Source: Massport.
Note: Passenger airlines carry cargo as belly cargo; Wiggins Airway and Mountain Air Cargo all fly for FedEx, Atlas Air and ABX Air all fly for DHL (grouped as "Other")

Cargo Trends in 2020

As the world reels from the outbreak of COVID-19, air freight continues to operate worldwide. Perhaps never in modern history has such attention been put on this industry and its vital role in providing medical equipment and other necessities.

27 This includes express/small packages, freight, and mail.

28 Massport. 2019.

While people around the world adjust to social distancing and remote working, logistics companies have been working around the clock to resolve disruptions and circumvent supply chain issues. The grounding of a large number of passenger aircraft has led to the loss of a sizeable share of cargo capacity (i.e., "belly" cargo). Approximately 40 to 45 percent of global international air freight consist of belly cargo; massive groundings of passenger aircraft are affecting countries/airports differently. Meanwhile, freighter aircraft continue to fly but not without challenges.

Air cargo volumes have been more resilient to coronavirus pandemic-related effects than passenger traffic activity. At the 10 largest U.S. cargo airports, passenger volumes were down 80 to 90 percent in the initial period of peak declines after March 2020, while cargo volumes have seen more mild declines or, in a few cases, significant growth.

At Logan Airport, as of the end of October, cargo has declined by around 17 percent in 2020, but, like many other large U.S. gateways, nowhere near the percentage declines in passenger volumes. Logan Airport saw its largest cargo volume decline in April 2020, at a decrease of 31 percent. In October 2020, cargo volumes were down 14.8 percent compared to October 2019, with the biggest drop in international cargo. Domestic mail and express/small package markets are seeing modest increases in volume associated with the online shopping trend associated with the pandemic.

Table 2-6 Cargo and Mail Operations and Volume (1990, 2000, and 2010–2019)

	1990	2000	2010	2013	2014	2015	2016	2017	2018	2019	Percent change (2018-2019)	Avg. Annual Growth (2013-2019)
All-Cargo Aircraft Operations	N/A	12,282	6,724	5,403	5,711	6,059	6,680	6,744	6,814	6,830	0.2%	4.0%
Volume (lbs.)												
Express/ Small Packages	N/A	484,490,143	339,485,424	334,315,119	356,743,626	336,013,472	352,551,369	376,009,078	396,304,856	395,108,073	(0.3%)	2.8%
Freight	N/A	367,857,011	206,893,979	203,877,671	228,716,329	239,768,129	264,382,330	303,398,899	307,895,701	293,831,074	(4.6%)	6.3%
Mail	119,818,113	194,902,513	25,904,205	19,407,738	22,087,150	30,556,356	23,215,743	29,271,688	31,481,901	28,536,921	(9.4%)	6.6%
Total	**753,253,075**	**1,047,259,667**	**572,283,608**	**557,600,528**	**607,547,105**	**606,337,957**	**640,149,442**	**708,679,665**	**735,682,458**	**717,476,068**	**(2.5%)**	**4.3%**

Source: Massport.
Notes: Avg. Annual Growth rates calculate compound annual growth (CAGR).
N/A Not Available.

3

Airport Planning

This Environmental Data Report (EDR) was prepared in 2020 during the ongoing COVID-19 worldwide pandemic. This EDR focuses primarily on calendar years 2018 and 2019, however, due to the dramatic effects of the pandemic on Airport activity in 2020, Massport has strived to include relevant updates through fall 2020. Beginning in March 2020, flights in and out of Logan Airport were dramatically reduced and passenger levels dropped by over 90 percent in the spring and summer of 2020. As a result, currently there are far fewer aircraft operations, passengers, and overall Boston Logan International Airport (Logan Airport or the Airport) activity. While activity levels began a slow recovery in mid-summer 2020, the ongoing wave of COVID-19 cases has resulted in continued historically low levels of activity, with a full recovery years away. As of October 2020, total flight operations for the year were down by 50 percent and passenger levels were down by about 70 percent compared to January through October 2019. Massport expects that by the end of 2020, passenger levels will have dropped to levels of activity not seen since the mid-1970s.

As a result of this significant reduction in Airport activity and dramatic reduction in revenues, Massport, our airlines, and other tenants have necessarily adjusted their operations. Concurrently, the schedule for a number of Airport projects and programs have been adjusted. To be as transparent as possible, this chapter includes the most current project updates through October 2020. As a result of the pandemic and the unprecedented reduction in passengers and revenues, many Massport and tenant projects have been deferred; the best available current status of these projects is included. Massport is continuing to review the status of its projects/programs and additional changes or deferments could occur. This includes careful review of both on and off-Airport activity levels to adjust its ground access programs to align with ridership levels. Massport remains committed to implementing project-related mitigation strategies, as documented in Chapter 9, *Environmentally Beneficial Measures and Project Mitigation Tracking*. Forthcoming EDRs will continue to provide updates, as available.

Introduction

The increase in the number of Logan Airport's air passengers through early 2020 was attributed to the strong local, regional, and national economies. To address that strong growth, Massport was implementing a strategy to address the associated operational and environmental challenges to allow Logan Airport to evolve in a sustainable and environmentally responsible way. Despite the current economic downturn, Logan Airport remains a key economic and transportation resource in the New England region, the state, and the Boston metropolitan area, which is home to a broad range of industries and institutions. In addition to supporting the growth and economic success of the state, Logan Airport and the airport industry are important elements in the state and regional economies. Logan Airport will continue to be an important resource as the region and the country move towards recovery.

This chapter updates the status of Logan Airport planning and development projects through 2018 and 2019 and includes available updates through October 2020. Specific topics include terminal area projects, service

area projects, buffer/open space projects, Airport parking projects, airside area projects, high occupancy vehicle (HOV) improvements, and Airport-wide projects. 2018 and 2019 were marked by construction of several projects focused on enhancing the passenger experience, accommodating increases in passenger activity levels, and improving ground access. Given the timing of the publication of this *2018/2019 EDR*, **Table 3-1** presents the status of recent progress on planning initiatives and individual projects at Logan Airport, as well as planned projects and projects under consideration, as of October 2020.

As discussed in Chapter 1, *Introduction/Executive Summary,* of this *2018/2019 EDR,* all Massport and tenant projects that trigger a threshold under the Massachusetts Environmental Policy Act (MEPA) or the National Environmental Policy Act (NEPA) will undergo the appropriate project-specific state and/or federal environmental review. This chapter provides an overview of planned projects to provide context for understanding the cumulative effects of Logan Airport activities.

Massport has identified priority planning projects and initiatives in the following categories:

- Ground Transportation and Parking;
- Terminals;
- Airside Planning;
- Service Areas;
- Airport Buffers and Open Space; and
- Energy, Sustainability, and Resiliency.

Ground Transportation and Parking Planning

Logan Airport ground access and parking are priority planning interests. Massport's focus in these areas is on HOV investment, management of RideApp services such as Uber and Lyft, parking management, and on-Airport roadway operations, safety, and congestion management.

In 2018 and 2019, Massport's strategies to improve and expand HOV service to and from Logan Airport included continued investment in Logan Express facilities and service. These improvements were in support of Massport's goal to double Logan Express shuttle bus ridership from 2 million to 4 million passengers (by the time Logan Airport reaches 50 million passengers), thereby reducing passenger and employee vehicle miles traveled (VMT), congestion, and associated air quality emissions. Those initiatives included both the urban and suburban Logan Express sites, and focused on increasing frequencies, adding parking, improving customer amenities, and reducing fares. Massport also continued to evaluate opportunities to add an additional urban and suburban location. Most notably, as a complement to the Back Bay service, in 2019 Massport purchased new buses in anticipation of opening a new urban location proximate to Boston's North Station in 2020. This effort is now deferred due to the pandemic.

In 2019, more than a quarter of on-Airport traffic was from activities related to RideApp (formerly known as Transportation Network Company/TNC) activity which contributed to unprecedented congestion on Airport roadways. In an effort to reduce congestion, emissions, and RideApp deadhead[1] activity, in October 2019, Massport relocated most RideApp drop-off/pick-up activity to the ground floor of the Central Parking Garage

1 Deadhead trips are those trips to or from the Airport that do not contain a passenger.

complex in December 2019, with the exception of drop-off at terminal curbs during the 4:00 AM to 10:00 AM peak departure period. The new area provides weather-protected and climate-controlled areas for passengers, including wheelchair assistance, curb-side baggage check, and other amenities. Specific curbside locations have been reserved at each terminal for drop-off/pick-up accommodations for persons with disabilities.

Massport's parking management strategy addresses parking supply, pricing, and operations to promote the use of HOV, transit, and shared-ride options, and to reduce environmentally harmful drop-off/pick-up modes. In accordance with the approvals by the Massachusetts Department of Environmental Protection (MassDEP) and the U.S. Environmental Protection Agency (EPA) to modify the Logan Airport Parking Freeze, Massport received state and federal approvals to build an additional 5,000 commercial parking spaces at Logan Airport in a new garage in front of Terminal E and by expanding the Economy Garage. Each proposed garage will be designed in accordance with Massport's Sustainable Design Standards and Guidelines and incorporate measures from the U.S. Green Building Council's sustainability-focused Parksmart rating system.[2] Design of the first 2,000 spaces to be constructed in a garage atop the existing surface lot across from Terminal E is underway, however, following the drop in passenger activity due to COVID-19, construction of the garage in front of Terminal E and expanding the Economy Garage is deferred. As part of modifying the Logan Airport Parking Freeze, Massport also committed to completing three key Logan Airport ground access studies. The findings of these studies were initially published as part of the Logan Airport Parking Project Final Environmental Impact Report (EIR)/Environmental Assessment (EA) in December 2019 and are available on Massport's website: http://www.massport.com/media/3370/final-massport-dep-report.pdf.

The studies analyze the feasibility and effectiveness of the following:

- Potential services and improvements to HOV access;
- Potential operational measures to further reduce drop-off/pick-up modes; and
- Possible pricing strategies for different modes.

Projects that aim to provide on-Airport roadway congestion relief include on-Airport roadway improvements to enhance efficiency and reduce congestion; roadway and curb improvements in front of Terminal C (Arrival and Departure levels) to reduce peak hour congestion and prioritize HOV access; and improvements to the roadways connecting Terminals B and C to improve circulation, reduce congestion, and improve safety. Construction is ongoing as of this filing and expected to be complete by summer 2023.

Terminal Area Planning

Massport completed the Terminal B Optimization Project in 2019, which upgraded the security checkpoints and added substantial passenger amenities primarily for American Airlines and Air Canada. Enhanced post-security connections between Terminals B and C are under construction to optimize passenger movements and security. Other enhancements include expanded passenger amenities for current and future passenger needs. Feasibility studies of post-security connections between Terminal A and Terminal B, and Terminal A and Terminal E were also initiated.

2 U.S. Green Building Council's Parksmart Certification Standard. https://www.usgbc.org/resources/parksmart-certification-standard.

Construction of the first phase of the Terminal E Modernization Project, will add four gates[3] to the international terminal; Phase 2 will add three additional gates. Construction of the remaining three new gates is being deferred due to the downturn in passenger activity. Massport is studying alternatives for connecting the Massachusetts Bay Transportation Authority (MBTA) Blue Line and the terminal area as part of the Phase 2 addition. Additionally, over 170,000 square feet of impervious surface is being converted to new green space along Terminal E for a total of 190,000 square feet of green space in that area. The *2020 EDR* will provide an update on the schedule for completing the Terminal E Modernization project.

Airside Planning

Massport continues to upgrade and improve the airfield to enhance the operational efficiency and safety of Logan Airport while exploring ways of efficiently using the limited land resources in the service areas. In coordination with the FAA, Massport completed a comprehensive multi-year Runway Incursion[4] Mitigation Study and Comprehensive Airfield Geometry Analysis (RIM, or RIM Study) to identify, prioritize, and develop strategies to help Massport mitigate risk.[5] Massport is also working with the FAA on concept design and permitting for enhancement of the runway safety area (RSA) of Runway 27. Based on the current level of planning, it is anticipated that the RSA improvements will include a pile-supported deck over Boston Harbor at the approach-end of Runway 27. Construction of the RSA improvements will be advanced once environmental approvals are secured and design is complete. Initial concept design and preliminary environmental review and permitting commenced in late 2019. Environmental data collection and field studies commenced in Spring 2020 including marine borings.

Service Area Planning

Massport is continually undertaking service area improvements to maximize efficient use of limited land resources and respond to the changing needs of airline businesses, customers, and tenants. Among several planned improvements, Massport is currently exploring options to improve the layout of the North Service Area (NSA) by reorganizing the existing uses to enhance safety and efficiency of activities located within the runway protection zone (RPZ). Massport issued a Request for Information (RFI) and is in the process of identifying a replacement for the current fixed-based operator (FBO) located in the NSA. In addition, Massport is advancing plans for construction of an additional jet fuel storage tank in the NSA, adjacent to the existing jet fuel storage tanks.

Airport Buffers and Open Space Planning

Massport has invested in an extensive open space program to enhance the surrounding communities. Massport initially committed over $15 million for the planning, construction, and maintenance of four Airport edge buffer areas and two parks along Logan Airport's perimeter. These buffers include the Bayswater Embankment Airport Edge Buffer, Navy Fuel Pier Airport Edge Buffer, Neptune Road Airport Edge Buffer, and the Southwest Service Area (SWSA) Airport Edge Buffer (Phases I and II). The award-winning Piers Park was completed in 1995 and has since become part of a network of greenspace that traverses East Boston from the

3 The Terminal E Modernization Project will add the three gates approved in 1996 as part of the International Gateway West Concourse project (EEA # 9791), but never constructed, and add an additional four gates.

4 Runway incursions occur when an aircraft, vehicle, or person enters the Airport's designated area for aircraft landings and take-offs.

5 Information on FAA's RIM program can be found at https://www.faa.gov/airports/special_programs/rim/.

Jeffries Point waterfront to Constitution Beach. In 2014, Massport completed construction of the East Boston Greenway Extension that connects Bremen Street Park to Wood Island Marsh. In 2016, Massport assumed operations of the City's Greenway extension to Constitution Beach. In October 2019, the East Boston Greenway was renamed Mary Ellen Welch Greenway, a long-time East Boston community activist.

Adjacent to the current Piers Park, Piers Park Phase II will add approximately 4.2 acres of green space to the East Boston waterfront upon completion. Studies are also underway by the Trustees of Reservations for a Piers Park Phase III, which would turn an aging pier into a 3.6-acre greenspace including resiliency features to help protect the neighborhood from flooding and sea level rise. As of this filing, the Trustees have begun outreach to community stakeholders to receive input for the design of the waterfront park. Today, East Boston enjoys 3.3 miles and more than 33 acres of green space developed or managed by Massport, in partnership with and in response to engagement with the East Boston community.

Energy, Sustainability, and Resiliency Planning

Massport continues to incorporate sustainability elements into its projects and is currently working on a vision for Sustainable Massport 2.0. The vision for this next-level planning effort is to implement principles and approaches from the Logan Airport Sustainability Management Plan (SMP) at other Massport facilities and to update Massport's sustainability goals and targets. Massport is also focused on the following:

- Facilitating the replacement of gas- and diesel-powered airfield ground service equipment (GSE) with all-electric GSE (eGSE) by the end of 2027 (as commercially available).
- Studying opportunities to maximize solar installations across Logan Airport and installing electric vehicle infrastructure on the airside and in the parking garages.
- In 2018, the EPA awarded a $541,817 grant to Massport to replace gas- and diesel-powered GSE at Logan Airport. This grant was used in conjunction with an FAA Voluntary Airport Low Emissions Program (VALE) grant that Massport received in Fall 2018 to install 50 eGSE charging stations at Terminal B, Pier B and eight eGSE charging stations at Terminal B, Pier A as part of the Terminal B Optimization Project.
- In 2018, an FAA VALE grant was awarded to Massport for $1.65 million to install 100 charging ports in partnership with American Airlines at Terminal B. In 2019, a VALE grant was awarded to Massport for $3.01 million in partnership with jetBlue Airways, to install 78 charger ports at Terminal C, the Amelia Earhart terminal, and at the jetBlue hangar. In 2019, Massport also installed eight ports under a Volkswagen (VW) settlement awarded grant amount of $165,859. All grants were subsidized with Massport funding to meet federal grant assurances.
- Massport has a robust program to identify vulnerabilities from climate and other natural threats on the Airport and is now incorporating resilient infrastructure design standards for existing and future flood levels for all types of Airport projects.

Due to COVID-19, 2020 passenger levels and operations have dramatically decreased. As of October 2020, year over year passenger levels and operations are down by approximately 70 percent and 50 percent, respectively. Therefore, Massport's previously planned programs and projects are under evaluation and subject to change.

Table 3-1 Logan Airport Short- and Long-Term Planning Initiatives

		Completion	
	Status as of October 31, 2020	Short-Term By End of 2025	Long-Term By End of 2035
Airport Ground Transportation and Parking Projects/Planning Concepts			
West Garage Parking Consolidation Project	Complete (2016)		
Logan Airport Parking Project (additional 5,000 spaces)	Deferred		
Logan Airport Parking Project: Parking Freeze Studies	Studies Complete (2019)		
On-Airport Roadway Congestion Relief Infrastructure	Feasibility/ Planning		✈
RideApp Infrastructure Improvement and Policy	Complete (2019)		
Logan Express Route and Facility Expansion (Off-Airport)	Deferred		
Terminal Area Projects/Planning Concepts			
Terminal E Renovations and Enhancements	Complete (2017)		
Terminal E Modernization (Phase 1 – 4 gates/Phase 2 – 3 gates)	Phase 1 – Construction Phase 2 – Deferred	Phase 1 ✈	
Convenience and Filling Station/ Taxi Pool/RideApp Lot Relocations	Complete (2019)		
Terminal B Optimization	Complete (2019)		
Terminal C to E Airside Connector	Complete (2016)		
Terminal C, Pier B Optimization	Complete (2019)		
Terminal C Canopy, Connector, and Roadway Project	Construction	✈	
Terminal A to B Airside Connector	Feasibility/Planning		✈
Airside Projects/Planning Concepts			
Runway 15L-33R Runway Safety Area (RSA) Improvement	Complete (2014)		
Runway 4R Light Pier Replacement	Complete (2017)		
Runways 22R and 33L RSA Improvements/Runway 33L Light Pier Replacement	Complete (2014)		
Runway 9-27 RSA Improvement Project	Planning/Permitting	✈	
Runway Incursion Mitigation (RIM) Study and Comprehensive Airfield Geometry Analysis	Complete (2019)		

Table 3-1 Logan Airport Short- and Long-Term Planning Initiatives (Continued)

		Completion	
	Status as of October 31, 2020	Short-Term By End of 2025	Long-Term By End of 2035
Service Area Projects/Planning Concepts			
Southwest Service Area (SWSA) Redevelopment Program (Rental Car Center)	Complete (2014)		
Logan Airport Runway Protection Zone (RPZ) Enhancements Equipment Storage and Maintenance Facility (ESMF)	Planning/Permitting	✈	
Jet Fuel Storage Addition – North Service Area (NSA)	Permitting/Design	✈	
Group 1 Hangar – South Cargo Area (SCA)	Feasibility/Planning	✈	
Governors Island Equipment Storage	Feasibility		✈
Relocated Compressed Natural Gas (CNG) Station – North Cargo Area (NCA)	Feasibility/Planning		✈
Replacement Cargo Facilities – NCA	Feasibility	✈	
Joint Operations Center (JOC)	Feasibility/Planning		✈
Airport Buffers/Open Space Projects			
SWSA Airport Edge Buffer (Phases I and II)	Complete (2014)		
Neptune Road Airport Edge Buffer	Complete (2016)		
Navy Fuel Pier Airport Edge Buffer	Complete (2007)		
Bayswater Embankment Airport Edge Buffer	Complete (2003)		
Bremen Street Park and Dog Park	Complete (2016)		
Greenway Connector	Complete (2014)		
Community Greenway Enhancements	Complete (2015)		
Narrow-Gauge Connector	Complete (2016)		
Piers Park Phase I	Complete (1995)		
Piers Park Phase II	Design	✈	
Piers Park Phase III (*by others*)	Feasibility		✈
Energy, Resiliency, and Sustainability Planning			
Energy Planning	Ongoing	✈	✈
Electric Ground Service Equipment (eGSE) installation	Ongoing	✈	✈
Resiliency Planning	Ongoing	✈	✈
Sustainability Planning	Ongoing	✈	✈

Notes: Anticipated completion dates and status as of October 31, 2020, as denoted by ✈.
Short-term projects are anticipated to be completed by 2025 and long-term projects are anticipated to be completed by 2035.
Details of each project or planning concept are provided in the sections that follow.

Ground Transportation and Parking Planning

Massport continues to implement a robust ground transportation strategy, which includes ongoing operational and capital commitments to the Logan Express services, the MBTA Silver Line 1 (SL1) service, and MBTA Blue Line station shuttles, as well as continued partnership with and marketing of private bus carriers.

As outlined in Chapter 1, *Introduction/Executive Summary*, this EDR was filed during the ongoing COVID-19 worldwide pandemic. While this report focuses primarily on activity in 2018 and 2019, as a result of the pandemic, a number of Massport's broad HOV and trip reduction measures temporarily changed in 2020. Flights in and out of Logan Airport have dramatically reduced and passenger levels dropped by nearly 90 percent beginning in March 2020. As a result, while operational and passenger levels have recovered somewhat as of mid-2020, overall, there are far fewer passengers and employees traveling to and from Logan Airport and there is far less peak period roadway congestion both in Boston and the metropolitan area. In addition, the public's interest in using HOV transportation services like buses, rapid transit and commuter rail, has also been significantly affected by concerns about the COVID-19 virus.

Within that context, Massport continues to evaluate and plan for the recovery of air passenger activity and remains committed to implementing the broad range of ground access strategies that were outlined in the *2017 ESPR*. The schedule for those services and planned improvements has, however, been adjusted due to the continuing operational constraints and revenue reductions. Massport continues to carefully review both on and off-Airport activity levels and will adjust its ground access programs to align with ridership level. Future EDRs will provide detailed updates on all service adjustments and activity levels.

HOV Investment

Massport continuously evaluates it strategies and programs aimed at improving and, where needed, expanding HOV services to and from Logan Airport, including continued investment in Logan Express facilities and service. Massport has a goal to double Logan Express ridership from 2 million to 4 million passengers, by the time Logan Airport reaches 50 million passengers, thereby reducing VMT, congestion, and air quality emissions by shifting riders from other vehicle modes. At suburban locations, Massport has the following action plan:

- Increase Braintree Logan Express service from two to three trips per hour (implemented in May 2019 but reduced to hourly service in March 2020 due to the impacts of COVID-19).
- Add about 1,000 additional spaces to the Framingham garage (permitting completed in 2020 however construction is deferred).
- Provide security line priority status to Logan Express Back Bay riders (implemented in 2019; this service is temporarily suspended due to COVID-19).
- Marketing to support Logan Express strategy and increase ridership.
- Implement Logan Express electronic ticketing (pending).
- Evaluate new Logan Express suburban locations, with a plan to open at least one new site (deferred due to COVID-19).

- Explore RideApp Last Mile connections.[6]
- Continue to monitor parking capacity at all Logan Express sites.

Massport has provided Logan Express service from Woburn for many years, however in early December 2020, this service was suspended due to the COVID-19 pandemic. Roughly 90 percent of the users were Logan Airport employees who will now be accommodated on-Airport.

Until March 2020, the Back Bay Logan Express operated daily between the hours of 5:00 AM and 10:00 PM. Initially, one-way fares to Logan Airport were $7.50 per passenger. Riders with a current, valid MBTA pass received a reduced $3.00 fare. In mid-2019, Massport implemented a number of improvements to the service with a focus on boosting urban Logan Express ridership:

- Change pick-up/drop-off location from Copley to Back Bay Station (implemented in 2019);
- Discount one-way fare from $7.50 to $3.00 (implemented in 2019);
- Free service from Logan Airport (implemented in early 2019);
- Pilot priority security line status for riders (implemented in 2019);
- Execute marketing campaign to support increased ridership (ongoing);
- Implement Logan Express electronic ticketing; and
- Implement a second urban Logan Express service at North Station (although Massport procured buses for this service in 2020, due to COVID-19 this new service has been deferred).

In March 2020, the Back Bay Logan Express service was suspended due to the drop in ridership; the plan is to monitor Logan Airport passenger activity closely and determine the appropriate time to restart the service.

Eight Silver Line buses, connecting the Airport to South Station, were purchased in 2005 by Massport and are operated by the MBTA, with Massport paying operating costs. In 2017, Massport funded mid-life rebuilds of four Silver Line buses and rebuilt four additional buses in 2018. The mid-life rebuild extends the useful life of each vehicle by approximately eight years. This will allow the MBTA to maintain reliability and quality of operations along the Silver Line today while initiating the procurement process to acquire new vehicles in the future. Since the existing Silver Line fleet is reaching the end of its useable life, the MBTA and Massport have been working together on a plan to procure a replacement Silver Line fleet. As part of this initiative, Massport and the MBTA developed a *Silver Line Capacity Study* to determine the mid-term fleet and facility needs as well as to assess other ways to improve the reliability and capacity of the system. Based on this analysis, the MBTA plans to procure 45 new enhanced electric hybrid vehicles to replace the existing fleet of 32 dual mode vehicles. Massport plans to purchase eight MBTA Silver Line buses as part of a forthcoming MBTA procurement. Chapter 5, *Ground Access to and from Logan Airport*, provides additional information on these efforts.

Starting with the 2019 Air Passenger Ground Access Survey, Massport is using an updated HOV definition where vehicle occupancies of taxis, black car limousines, and RideApp vehicles that exceed one air passenger

6 Individuals who fall within the 0.5-mile to 1-mile drive distance of a Logan Express facility are the most likely group to use RideApps to connect between the facility and their home.

per vehicle are considered HOV, while the same modes with one air passenger count as non-HOV. With this updated definition, Massport has committed to a goal of 35.5 percent HOV by 2022 and 40 percent HOV by 2027.

Progress towards Massport's HOV goal is measured using the triennial Air Passenger Ground Access Survey. The latest published survey, conducted in 2019, revealed an air passenger ground access mode share of 40.4 percent for HOV and shared-ride modes, exceeding both near-term and longer-term goals. COVID-19 has had a range of impacts on ground transportation, particularly on the use of ground access HOV modes. While it's anticipated that the HOV mode share will drop as a result of COVID-19 over the short term, Massport expects HOV ridership to recover over time and remains committed to the HOV mode share goals going forward.

Parking Management

Massport continues to manage parking supply, pricing, and operations to promote the use of HOV, transit, and shared-ride options and to reduce drop-off/pick-up modes. As air traveler numbers increased through early 2020, the legally constrained parking supply at Logan Airport, resulting from the Logan Airport Parking Freeze, had periodically had the unintended consequence of causing an increase in environmentally harmful drop-off/pick-up vehicle trips. The goal of the Logan Airport Parking Project is to reduce the use of drop-off/pick-up modes, which generate up to four vehicle trips instead of two (**Figure 3-1**). While the intent of the Logan Airport Parking Freeze has been to shift air passengers to HOV travel modes with lower VMT, survey data collected from the 1970s to the present at Logan Airport have consistently shown that if parking was not an option for passengers who parked on-Airport, 77 percent of diverted parkers would use drop-off/pick-up modes-generating a higher level of VMT and associated air emissions (**Figure 3-1**).

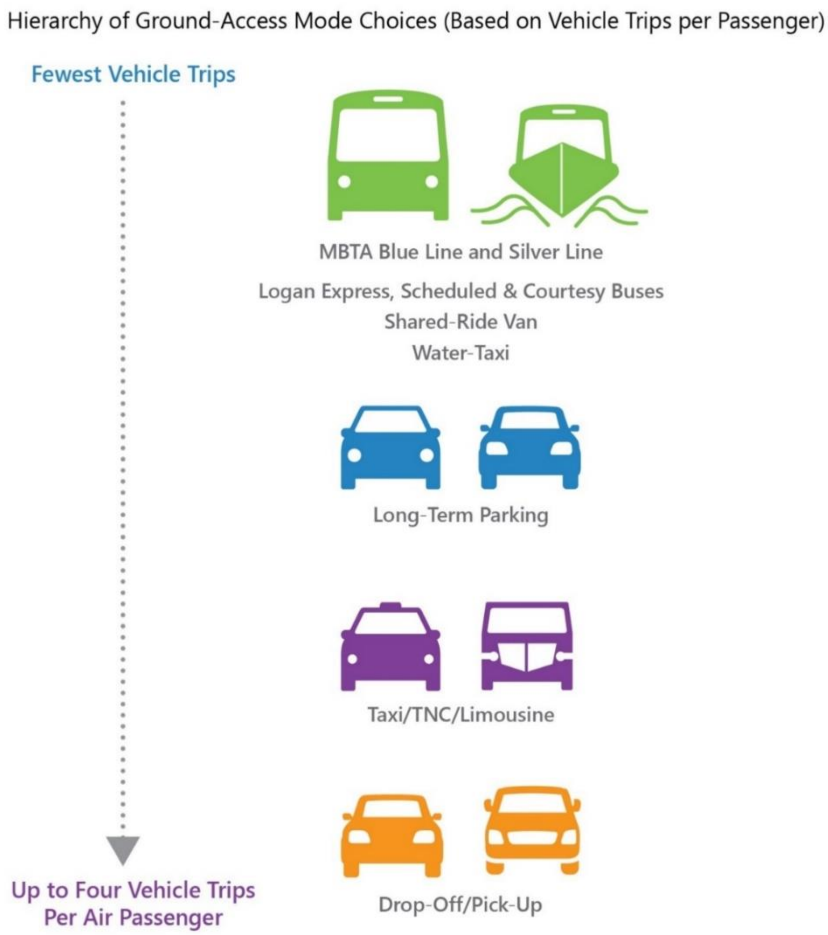
In 2017, the Logan Airport Parking Freeze regulation was revised to allow for an increase of 5,000 on-Airport commercial parking spaces to alleviate constrained parking conditions on-Airport. Until the recent amendments to the Logan Airport Parking Freeze, the total number of employee and commercial parking spaces permitted at Logan Airport was limited to 21,088 spaces under the State Implementation Plan (SIP) and MassDEP air quality regulations; the amendment has increased the limit to 26,088 spaces (there was no increase in the number of employee parking spaces).

While design of the initial project phase (2,000 spaces in a new garage at the existing surface parking lot in front of Terminal E) commenced in 2019, that project is currently deferred. **Figure 3-2** shows the proposed sites for new parking garage facilities.

Table 3-2 describes plans for commercial parking projects at Logan Airport.

In accordance with the modified Logan Airport Parking Freeze approved by MassDEP and the EPA, to allow for an additional 5,000 commercial parking spaces at Logan Airport, Massport completed three key Logan Airport ground access studies, also known as the *Logan Airport Parking Freeze Amendment Ground Access and Trip Reduction Strategy Studies*. The findings of these studies were initially published as part of the Logan Airport Parking Project Final EIR/EA in December 2019, and are available on Massport's website: http://www.massport.com/media/3370/final-massport-dep-report.pdf.

Figure 3-1 Ground-Access Mode Choice Hierarchy



Source: VHB.
Notes: Short-term parking is included under "drop-off/pick-up."
Rental cars are included in the number of Parked Vehicles.

FIGURE 3-2 Location of Airport Ground Access Projects/Planning Concepts

2018/2019 Environmental Data Report

Notes: See Table 3-2 for a description of the numbered projects. Status as of October 31, 2020.

1. West Garage Parking Consolidation (complete)

2a. Logan Airport Parking Project - Economy Garage

2b. Logan Airport Parking Project - Terminal E Surface Lot

Airport-Wide or Location To Be Determined

3. Logan Airport Parking Project: Parking Freeze Studies
4. On-Airport Roadway Congestion Relief Infrastructure
5. RideApp Infrastructure and Policy
6. Logan Express Route and Facility Expansion (Off-Airport)

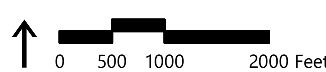


Table 3-2 Description and Status of Airport Ground Access Projects/Planning Concepts (October 31, 2020)

Description	Status
1. West Garage Parking Consolidation Project	
Massport consolidated 2,050 temporary parking spaces as an addition to the West Garage and at the existing surface lot between the Logan Office Center and the Harborside Hyatt. The project incorporated sustainable design and resiliency elements.	On March 20, 2014, the Executive Office of Energy and Environmental Affairs (EEA) issued an Advisory Opinion confirming no review of the Massachusetts Environmental Policy Act (MEPA) was required for the consolidation of existing on-Airport parking spaces. The consolidation project was completed in late 2016.
2. Logan Airport Parking Project (additional 5,000 spaces)	
As one element of its comprehensive transportation strategy, Massport has proposed the phased construction of 5,000 new on-Airport commercial parking spaces at Logan Airport in two locations. This project would include construction of a 2,000-space structured garage in the parking lot in front of Terminal E and a 3,000-space addition to the Economy Garage. Each of the proposed garages will be designed in accordance with Massport's Sustainable Design Standards and Guidelines and incorporate measures from the U.S. Green Building Council's Parksmart rating system, an environmental and sustainability focused rating system specific to parking structure management, programming, design, and technology.	The Massachusetts Department of Environmental Protection (MassDEP) issued the amended regulation on June 30, 2017 approving the requested parking increase. On December 5, 2017, the U.S. Environmental Protection Agency (EPA) proposed a rule approving the revision of the Massachusetts State Implementation Plan (SIP) incorporating the amended Logan Airport Parking Freeze. The final rule was issued on March 6, 2018 and became effective on April 5, 2018. Massport initiated a parallel process with EEA by filing an Environmental Notification Form (ENF) for new parking facilities on March 31, 2017. A Secretary's Certificate on the ENF was issued on May 5, 2017 establishing the scope for the required Draft Environmental Impact Report (EIR). The Draft EIR/Environmental Assessment (EA) was published in May 2019. The Final EIR/EA was filed in November 2019 and the Secretary's Certificate was issued on January 30, 2020. Massport is currently advancing final design for the first 2,000 spaces in the parking lot across from Terminal E. Both phases are deferred, due to the reduction in passenger activity associated with the pandemic.
3. Logan Airport Parking Project: Parking Freeze Studies (Airport-wide)	
In accordance with the June 2017 approval by MassDEP and the April 2018 approval by the EPA to modify the Logan Airport Parking Freeze to allow for an additional 5,000 commercial parking spaces, Massport has taken steps to advance three key ground access studies. These include analyzing the feasibility and effectiveness of the following: ▪ Potential services and improvements to high occupancy vehicle (HOV) access; ▪ Possible pricing strategies for different modes; and ▪ Potential operational measures to further reduce drop-off/pick-up modes.	The findings of these studies were initially published as part of the Logan Airport Parking Project Final Environmental Impact Report EIR/EA in December 2019, are available on Massport's website: http://www.massport.com/media/3370/final-massport-dep-report.pdf.

Table 3-2 Description and Status of Airport Ground Access Projects/Planning Concepts (October 31, 2020) (Continued)

Description	Status
4. On-Airport Roadway Congestion Relief Infrastructure (locations to be determined)	
In addition to the planned roadway improvements as part of the Terminal C Building, Roadway, and Curb Enhancements, Terminal E Modernization, and Logan Airport Parking Projects, Massport was considering other possible infrastructure modifications to complement the roadway changes mentioned above, as well as policy changes to allow terminal area roadways and curbsides to continue functioning adequately and minimize vehicle idling time and associated emissions. Several options were being considered to reduce on-Airport congestion and improve on-Airport ground access efficiency; however, these studies are currently deferred and will be revisited once passenger levels recover.	Possible infrastructure and management options for improving ground access efficiency at Logan Airport will be evaluated once passenger levels recover closer to 2019 levels.
5. RideApp (formerly Transportation Network Company) Infrastructure and Policy (Airport-wide)	
Massport began tracking and reporting RideApp service (such as Uber and Lyft) activity in 2017. RideApps are estimated to contribute approximately 15,000 vehicle trips per day (excluding deadhead trips). RideApp operations are adversely impacting other modes to the Airport and contributing to on-Airport congestion. As RideApps have become an increasingly popular option for travelers going to and from Logan Airport, Massport has and will continue to develop strategies to facilitate efficient operation of all modes of ground transportation. In an effort to reduce congestion and emissions, Massport has a robust plan to manage RideApp operations and reduce RideApp deadhead activity. Massport's plan includes a rematch and shared ride program, RideApp fee structure changes to encourage shared rides and competition between modes, and optimization of RideApp operations on-Airport. Additional details can be found in Chapter 5, *Ground Access to and from Logan Airport*.	Massport consolidated RideApp activities on the ground floor of the Central and West Garages in October 2019. Pricing and policy changes continue to be evaluated as operational conditions evolve.
6. Logan Express Route and Facility Expansion (Off-Airport)	
To maximize Logan Airport's off-campus traffic and infrastructure improvements, Massport has a goal to double Logan Express ridership from 2 million to 4 million passengers, by the time Logan Airport reaches 50 million passengers, thereby reducing vehicle miles traveled (VMT), congestion, and air quality emissions by shifting riders from other vehicle modes. Investments being considered for Logan Express include improving Back Bay Logan Express service, offering a new urban Logan Express service at North Station, pursuing new suburban Logan Express locations, increasing the frequency of the Braintree service, investing in existing suburban sites, and investing in structured parking at existing sites, among others. Additional details can be found in Chapter 5, *Ground Access to and from Logan Airport*.	Some initiatives to expand Logan Express routes and facilities commenced in 2018 and 2019, (e.g., studies to improve ridership, expansion of services, and evaluation of new suburban Logan Express locations). In response to the COVID-19 pandemic, in March 2020 many service reductions were implemented to better align with the severely reduced passenger levels. Further adjustments will be made overtime in line with recovery of passenger and employee activity levels. In early December, Massport suspended service at the Woburn Logan Express site.

Source: Massport.
Notes: See **Figure 3-2** for the location of Airport parking projects/planning concepts.

Terminal Area Planning

The terminal area accommodates most of the passenger functions at Logan Airport, including the passenger terminals, terminal-area roadways, central parking facilities, and the Hilton Hotel. **Table 3-3** presents information on the status of each ongoing terminal area project. In addition, both Massport and its tenants are proposing projects or exploring planning concepts to modernize and carry out future improvements to the existing terminal facilities. The location of the ongoing terminal area projects and the planning concepts are shown on **Figure 3-3**.


Source: Stantec.
Notes: Terminal C roadway construction after demolition of the old air traffic control tower (left). Terminal C roadways under construction (right).

FIGURE 3-3 Location of Projects/Planning Concepts in the Terminal Area

2018/2019 Environmental Data Report

Notes: See Table 3-3 for a description of the numbered projects. Status as of October 31, 2020.

1. Terminal E Renovation and Enhancements (complete)
2. Terminal E Modernization
3a. Relocated Convenience and Filling Station (complete)
3b. Relocated Taxi Pool Lot
3c. Relocated RideApp Lot
4. Terminal B Optimization
5. Terminal C to E Airside Connector (complete)
6. Terminal C, Pier B Optimization (complete)
7. Terminal C Canopy, Connector, and Roadway Project
8. Terminal A to B Airside Connector

0 500 1000 2000 Feet

Table 3-3 Description and Status of Projects/Planning Concepts in the Terminal Area (October 31, 2020)

Description	Status
Massport Projects/Planning Concepts	
1. Terminal E Renovation and Enhancements This project included interior and exterior improvements at Terminal E to accommodate regular service by wider and longer Group VI aircraft. The project did not include any new gates but did include the reconfiguration of three existing gates to accommodate Group VI aircraft (including the A380 and B747-8 used by international air carriers). Some runway and taxiway shoulders were upgraded to support more frequent Group VI activity.	Planning was initiated in 2014. A federal Environmental Assessment (EA) was filed in July 2016, and the Federal Aviation Administration (FAA) issued a Finding of No Significant Impact (FONSI) on July 29, 2016. Project construction was completed in early 2017.
2. Terminal E Modernization (incorporates former West Concourse Project) The Terminal E Modernization Project will add the three gates approved in 1996 as part of the International Gateway West Concourse project (EEA # 9791), but never constructed, and add an additional four gates. The building will be aligned to function as a noise barrier. New passenger areas and passenger holdrooms are being planned, as well as possible additional Federal Inspection Services (FIS) and Customs and Border Protection (CBP) facilities to supplement the existing FIS areas in Terminal E. The Terminal E Modernization Project will occupy a portion of the North Cargo Area (NCA) and will include terminal gates, aircraft parking, hangars, and cargo facilities. The existing UPS cargo building will be relocated. Upon completion of this project and following a broader ground transportation strategy and planning process, a covered pedestrian connection between Terminal E and the Massachusetts Bay Transportation Authority (MBTA) Blue Line Airport Station will be constructed to improve passenger convenience. This connection is currently being studied and various approaches are under consideration.	An Environmental Notification Form (ENF) was filed with the Executive Office of Energy and Environmental Affairs (EEA) in October 2015. A joint draft federal Environmental Assessment (EA)/state Environmental Impact Report (EIR) was filed in July 2016 in accordance with the National Environmental Policy Act [NEPA] and the Massachusetts Environmental Policy Act [MEPA]). Massport filed the Final EA/EIR on September 30, 2016. FAA issued a FONSI on November 10, 2016, and a Record of Decision (ROD) on the project on November 14, 2016, stating that Massport can update the Airport Layout Plan (ALP) with the Terminal E Modernization Project. (copies of the Secretary's Certificates on the ENF, Draft and Final EA/EIRs, with responses to those comments, in Appendix A, *MEPA Certificates and Responses to Comments).* Initial construction began in 2019. In June 2020, the construction program was adjusted in response to the COVID-19 pandemic and resulting passenger and revenue declines. Currently, Massport is proceeding with construction of the first four gates that will connect to the existing Terminal E with a mid-2023 anticipated completion. An update on a schedule to complete the remaining three gates and covered pedestrian connection to the Blue Line Airport Station will be provided in the next EDR; currently Phase 2 of the project is deferred.

Table 3-3 Description and Status of Projects/Planning Concepts in the Terminal Area (October 31, 2020) (Continued)

Description	Status
Massport Projects/Planning Concepts	
3. Convenience and Filling Station/Taxi Pool/RideApp Lot Relocations	
Construction of the Terminal E Modernization Project includes the relocation of the existing on-Airport gas station to the intersection of Tomahawk Drive and Jeffries Street on Massport property (Southwest Service Area [SWSA]). With input from the community-based Logan Impact Advisory Group, this location provides community benefits such as convenience stores for local vendors (Starbucks and Meridian Food Market), and landscaping and beautification enhancements. Another part of the design phase involved Massport further evaluating transportation and land-uses in this area in an effort to reduce vehicular congestion along Tomahawk Drive associated with the RideApp mode. The RideApp Pool Lot was relocated to the existing taxi pool at Porter Street to minimize Tomahawk Drive traffic and congestion. Similarly, the existing taxi pool lot was returned to the Blue Lot between the Logan Office Center and the Hyatt Hotel. By relocating the RideApp pool, greater operational flexibility and additional routing options are available that will allow Massport to reduce RideApp service impacts along Tomahawk Drive (shown as 3a, 3b, and 3c in **Figure 3-3**).	The replacement gas station was approved as part of the Terminal E Modernization Project's MEPA and NEPA review process described above. Construction was completed in 2019. Massport relocated both the RideApp Lot and Taxi Pool Lot in the fall of 2018. The project included traffic signal modifications along Harborside Drive.
4. Terminal B Optimization	
Similar to the recent renovations and improvements at Terminal B, Pier A, Massport is upgrading its facilities on the Pier B side to meet airlines' needs (primarily reflecting the merger of American Airlines and US Airways) and to provide facilities that improve the passenger traveling experience. Improvements included an enlarged ticketing hall, improved outbound bag area, expanded baggage claim hall, expanded concession areas, and expanded holdroom capacity at the gates. The project consolidated American Airlines operations to one pier of the terminal (currently operating on two different sides of the terminal); all Terminal B Pier B gates are now connected post security. The project also consolidated checkpoint operations for better passenger throughput and improved passenger experience.	Massport prepared a Draft EA in May 2017 and a Final EA in June 2017. On June 29, 2017, the FAA issued a FONSI. Work on Pier B is substantially complete, while work on Pier A was completed in the summer of 2019.
5. Terminal C to E Airside Connector	
A connector between Terminals C and E provides a greater post-security connectivity between terminals and improves flexibility for airlines. In addition, the Terminal C to E Connector provides a post-security connection between Terminals C and E on the Departures Level. The connector provides improved passenger circulation within the post-security concourse(s), additional holdroom space at Terminal E, reconfigured office space, concessions and concessions support, and a new consolidated location for escalators and stairs.	The Terminal C to E Airside Connector was a project component of the Renovations and Improvements at Terminals B & C/E Environmental Assessment approved by FAA in 2012. The Terminal C to E Airside Connector construction was completed in May 2016.

Table 3-3 Description and Status of Projects/Planning Concepts in the Terminal Area (October 31, 2020) (Continued)

Description	Status
Massport Projects/Planning Concepts	
6. Terminal C, Pier B Optimization This project will make improvements within the existing footprint of Terminal C, Pier B. Existing passenger areas will be renovated and a second level of less than 5,000 square feet will be added. A jet bridge will be installed at an existing aircraft parking position.	Project construction was completed in 2019.
7. Terminal C Canopy, Connector, and Roadway Project Massport is planning improvements that will enhance Terminal C facilities and provide a post-security connector between Terminals B and C, replace aging roadways serving the terminals, and improve the operation of the Terminal C curb. The enhancements also include replacement of the existing canopy on the Departures Level. The project will enhance Logan Airport's ability to efficiently accommodate current and future passenger volumes by bringing the terminal facilities up-to-date and improving access, egress, and drop-off/pick-up operations. Massport removed the "Old Tower" in Summer of 2020 to accommodate the roadway and curb enhancements.	The FAA issued a FONSI in November 2018. Construction of the building enhancements and reconfigured roadway began in fall of 2019. The building enhancements are nearly complete as of this filing and the roadway work is progressing through the Fall of 2020. As of October 2020, the "Old Tower" removal was substantially completed. At this time, construction of the replacement canopy is anticipated to begin and be completed in 2021, with a slightly reduced program than originally planned. Completion of the Terminal C to B Connector is anticipated to be complete in spring 2022 and roadways are anticipated to be complete in summer 2023.
8. Terminal A to B Airside Connector As part of the Airport-wide effort to enhance terminal connectivity post-security, a secure-side connector between Terminals A and B is under consideration.	The airside connector between Terminals A and B is still being considered, however, this project is not currently in the five-year Capital Program.

Source: Massport.
Notes: **See Figure 3-3** for the location of terminal area projects/planning concepts.

Airside Planning

The airside area includes all Logan Airport land from the edge of the terminal buildings to the Logan Airport harbor boundary, incorporating the Logan Airport apron, runways, gates, and other airfield operating facilities. Airside improvements include upgrades and improvements to the airfield to enhance the operational efficiency and safety of Logan Airport.

Nationally, FAA continues working to reduce potential airfield safety concerns. One current focus is reducing runway incursions, which occur when an aircraft, vehicle, or person enters an Airport's designated area for aircraft landings and take-offs. In 2019, in coordination with the FAA, Massport completed a comprehensive multi-year Runway Incursion Mitigation Study (RIM, or RIM Study) and Comprehensive Airfield Geometry Analysis to identify, prioritize, and develop strategies to help Massport mitigate incursion risk.[7] Massport identified and prioritized airfield locations where safety can be improved or that could be improved over the next 15 to 20 years, subject to federal, state, and local environmental reviews and permitting.

Massport is also currently exploring options to improve the layout and efficiency of the North Service Area (NSA) by reorganizing the existing uses and enhancing safety within the runway protection zone (RPZ). **Table 3-4** describes the status of these and other projects (as shown on **Figure 3-4**) and planning concepts under consideration for Logan Airport's airside area as of October 2020, and provides additional updates as available.

7 Information on FAA's RIM program can be found at https://www.faa.gov/airports/special_programs/rim/.

FIGURE 3-4 **Location of Projects/Planning Concepts on the Airside**

2018/2019 Environmental Data Report

Notes: See Table 3-4 for a description of the numbered projects. Status as of October 31, 2020.

1. Runway 15L-33R RSA Improvement (complete)
2. Runway 4R Light Pier Replacement (complete)
3. Runways 22R and 33L RSA Improvements/ Runway 33L Light Pier Replacement (complete)
4. Runway 9-27 RSA Improvement
5. Runway Incursion Mitigation Study and Comprehensive Airfield Geometry Analysis

0 500 1000 2000 Feet

Table 3-4 Description and Status of Projects/Planning Concepts on the Airside (October 31, 2020)

Description	Status
1. Runway 15L-33R Runway Safety Area (RSA) Improvement Project As part of an ongoing program to improve safety at Logan Airport, and in close coordination with the Federal Aviation Administration (FAA), Massport proposed shifting existing Runway 15L-33R to accommodate an expanded RSA at the westernmost end (Runway 15L approach) of the runway. The project shifted the runway 200 feet to the southeast in order to comply with FAA standards requiring safety areas of 150 feet wide by 300 feet long at both ends of the runway.	The FAA issued a National Environmental Policy Act (NEPA) Categorical Exclusion on April 1, 2014. The project was completed in late 2014.
2. Runway 4R Light Pier Replacement Massport replaced the aging Runway 4R wooden approach light pier with a new modern structure with concrete pier/pilings.	Construction was completed in the fall of 2017.
3. Runways 22R and 33L RSA Improvements/ Runway 33L Light Pier Replacement The Runway 33L RSA project initially proposed replacing the landward 500 feet of the light pier to bring the RSA up to current standards. During RSA construction, it was determined that the remaining 1,900 feet of the light pier should be replaced due to its advanced age and efficiencies of combining the construction with the RSA project in summer 2012 while the runway was already closed. As described in the Final Environmental Assessment/ Environmental Impact Report (EA/EIR), an Inclined Safety Area (ISA) similar to what was constructed at Runway-End 22L was constructed for Runway End 22R. A pile-supported deck with an Engineered Materials Arresting System (EMAS) approximately 460 feet long by 300 feet wide was approved for Runway End 33L.	Massport filed an Environmental Notification Form (ENF) on June 30, 2009. A Draft EA/EIR was filed on July 15, 2010, and a Final EA/EIR on January 31, 2011, and the Secretary's Certificate was issued March 18, 2011. Remaining environmental permits were obtained by May 2011, and construction of the Runway 33L RSA was completed ahead of schedule in November 2012. Runway End 22R enhancements were completed in late 2014, including replacement of the EMAS installed in 2005. Massport filed a Notice of Project Change (NPC) in January 2012. The Secretary's Certificate was issued on March 9, 2012. All local, state, and federal permits were obtained for the additional work in June 2012, and the full replacement was completed in October 2012. As part of this project, the Runway 33L Instrument Landing System (ILS) approach, originally approved in the Airside Improvements Planning Project, was upgraded from Category I to Category III. Reduction in approach minimums on Runway 15R and Runway 33L was implemented in 2013, following the completion of the Runway 33L Light Pier replacement and FAA testing of new ILS equipment. Mitigation measures for eelgrass and salt marsh impacts have been implemented. See Chapter 9, *Environmentally Beneficial Measures and Project Mitigation Tracking,* for more information on continuing monitoring.

Table 3-4 Description and Status of Projects/Planning Concepts on the Airside (October 31, 2020) (Continued)

Description	Status
4. Runway 9-27 RSA Improvement Project	
As part of the Runway Incursion Mitigation (RIM) Study, RSAs at Logan Airport were analyzed for conformance with FAA standards. The FAA requires RSAs to accommodate aircraft overruns, undershoots, and veer-offs in emergency situations. Consistent with FAA requirements, Massport is continuously looking for opportunities to increase the margin of safety for all runways and, where practicable, providing the FAA standard for RSAs at all locations. At Logan Airport, the FAA standard for RSAs is typically 500 feet wide by 1,000 feet long at each runway end. Where this space is not available, FAA has approved the use of an EMAS for aircraft overrun protection. An EMAS uses a system of collapsible concrete blocks that can stop an aircraft by exerting predictable forces on the landing gear while minimizing aircraft damage. The RIM Study evaluated multiple alternatives for Runway 9-27 RSA enhancements and recommended construction of a deck, with an EMAS to meet the FAA safety requirements. The RSA at the end of Runway 27 is expected to be similar to the pile supported deck installed at Runway 33L.	The FAA issued a determination that approved the recommended alternative as it met applicable FAA safety requirements while minimizing environmental impacts. Initial concept design and preliminary environmental review and permitting commenced in late 2019. Environmental data collection and field studies commenced in Spring 2020 including marine borings.
5. Runway Incursion Mitigation (RIM) Study and Comprehensive Airfield Geometry Analysis	
FAA recently initiated a nationwide comprehensive multi-year RIM program to identify, prioritize, and develop strategies to help airport sponsors mitigate risk. Runway incursions occur when an aircraft, vehicle, or person enters the Airport's designated area for aircraft landings and take-offs.[1] Risk factors may include unclear taxiway markings, airport signage, and more complex issues such as runway or taxiway layout.	Massport has worked with FAA to identify areas that need to be addressed and plan for the implementation of safety measures. The study commenced in December 2016 and was completed in June 2019.

Source: Massport.
Notes: See **Figure 3-4** for the location of airside projects/planning concepts.
1 Information on FAA's RIM program can be found at https://www.faa.gov/airports/special_programs/rim/.

Service Area Planning

Logan Airport's service areas contain airline support businesses and operations. Land use in the service areas continue to evolve in response to changing airline business, customer and tenant needs, as well as public works projects. Massport continues to explore ways of efficiently using the limited land resources in the service areas. The six service areas at Logan Airport are shown in **Figure 3-5** and are described below.

- **North Cargo Area (NCA)** is in Logan Airport's northwest corner. It is bounded by the main Logan Airport outbound roadway to the south, Route 1A to the west, Prescott Street to the north, and Terminal E to the east. The NCA, which is adjacent to Logan Airport's airside area, is the Airport's primary airline support area. It accommodates essential airline support businesses including hangars, GSE maintenance, air cargo, and aircraft parking. The NCA will remain the most appropriate location for operations that require contiguous airside access. The Terminal E Modernization Project will eventually occupy a portion of the NCA and will include terminal gates, aircraft parking, hangars, and cargo facilities. Portions of the NCA will continue to be used for economy parking. Expansion of the Economy Garage, as part of the Logan Airport Parking Project, has completed the permitting process; the construction of the Economy Garage construction is deferred.
- **North Service Area (NSA)** is north of Prescott Street and extends to the Green Bus Depot Site, the MBTA Wood Island Station, and Runway End 15R. The NSA includes two flight kitchens, weather and navigation equipment, the Green Bus Depot, Facilities 2 and 3, the Large Vehicle Storage Facility, Hangar 5, BOSFuel Fuel Farm, water tanks, Signature Flight Support (a fixed-based operator), and Logan Airport Greenway, among others. The Greenway Connector and Narrow-Gauge Connector both run parallel to the MBTA Blue Line corridor in this section of the Airport. Massport is currently exploring options to improve the layout and efficiency of the NSA by reorganizing the existing uses which would expand Remain Over Night (RON) aircraft parking, remove an unused building in the RPZ, and improve overall land use. This project is expected to require review under NEPA. Massport has issued a Request for Information (RFI) and is in the process of identifying a replacement for the current FBO located in the NSA.

  Also within the NSA, Massport is planning to expand its jet fuel storage facilities to be constructed opposite the Economy Garage. An additional jet fuel storage tank is planned to meet recent and future demand at Logan Airport. The additional facilities will be constructed on the site of an abandoned Massport water pumping station, located on Prescott Street adjacent to the Economy Garage. Massport is advancing project design and permitting; a schedule for construction has not been determined at the time of this filing.
- **Southwest Service Area (SWSA)** is south of Logan Airport's main access roadway and is bounded on the east by Harborside Drive. Because of its proximity to the terminals and the regional highway system, the SWSA functions as Logan Airport's primary ground transportation hub and includes the Rental Car Center (RCC), and the taxi, RideApp, and bus/limousine pools. The RCC reduces Airport VMT and improves roadway and intersection operations through: consolidation of the rental car shuttle bus fleet and some Massport shuttle buses into a unified shuttle route system, resulting in the elimination of eight rental car bus fleets (a net total of 66 buses eliminated); improvement of intersection and roadway infrastructure, including signal coordination and dedicated ramp connections; and establishment of a Ground Transportation Operations Center (GTOC), enabling efficient planning and operation of Airport-wide transit activities. As part of the Terminal E Modernization Project, the existing on-Airport gas station was relocated to the SWSA in 2019, and combined with a new community convenience store/market and Starbucks.

- **Bird Island Flats (BIF)** is located south of the Logan Airport SWSA. BIF has landside access via Harborside Drive and water access through the system of water taxis that shuttle passengers between downtown Boston, the South Shore, and Logan Airport. BIF development includes the Hyatt Hotel and Conference Center, the Logan Office Center and adjoining garage, an employee parking lot (Lot B), the Logan Taxi Pool, the Water Shuttle Dock, the Logan Airport Rescue and Fire Fighting Facility Marine Dock, and the Harborwalk, a publicly accessible promenade along the harbor's edge.
- **South Cargo Area (SCA)** is located southeast of the Logan Airport SWSA and is generally bounded on the south by Harborside Drive and on the east and north by Logan Airport's airside area. The SCA, which provides landside access and secured airside access, is Logan Airport's primary cargo area and accommodates domestic and international cargo operations.
- **Governors Island** is at Logan Airport's southern tip and is bounded by Runway 14-32 and Boston Harbor to the east and south, by Runway 4R to the west, and Runway 9 to the north. Governors Island has functioned as a storage site for the Central Artery/Tunnel (CA/T) Project and for construction stockpiles. The area also contains an Aircraft Rescue and Fire Fighting Facility training area, parking for snow removal equipment, a biocell remediation area, and FAA aircraft navigation equipment. The area has been considered as a future location of RON aircraft parking, and potentially other uses (including cold storage).

Table 3-5 presents information on the status of each ongoing project and planning concept in the service areas. Both Massport and Logan Airport tenants are proposing projects or exploring planning concepts to modernize and carry out future improvements to the service areas. The locations of the ongoing service area projects and planning concepts that may potentially be constructed in the future are shown on **Figure 3-6**.

FIGURE 3-5 Logan Airport Service Areas

2018/2019 Environmental Data Report

Service Areas

0 500 1000 2000 Feet

FIGURE 3-6 Location of Projects/Planning Concepts in the Service Areas

2018/2019 Environmental Data Report

Notes: See Table 3-5 for a description of the numbered projects. Status as of October 31, 2020.

1. SWSA Redevelopment Program (complete)
2. Logan Airport RPZ Enhancements ESMF Relocation
3. Jet Fuel Storage Addition - NSA
4. Governors Island Equipment Storage

Locations To Be Determined

5. Relocated CNG Station - NCA
6. Replacement Cargo Facilities - NCA
7. Joint Operations Center

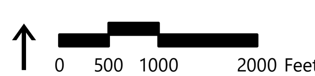


Table 3-5 Description and Status of Projects/Planning Concepts in the Service Areas (October 31, 2020)

Description	Status
Massport Projects/Planning Concepts	
1. Southwest Service Area (SWSA) Redevelopment Program The SWSA Redevelopment Program replaced and upgraded existing ground transportation uses within the SWSA. This included the consolidated Rental Car Center (RCC); support facilities for the car rental operations; a new clean-fuel unified shuttle bus system; a relocated and reconfigured taxi pool; bus and limousine pool; roadway improvements, pedestrian and bicycle facilities, and site landscaping. It also included a customer service center and four quick turn-around maintenance and service facilities. The Ground Transportation Operations Center (GTOC) within the RCC functions as the hub for management of ground transportation at the Airport. Phase II of the SWSA Airport Edge Buffer (EEA #14137) was integrated into the proposed SWSA Redevelopment Program.	A Final state Environmental Impact Report/federal Environmental Assessment (EIR/EA) was prepared in accordance with the Secretary of the Executive Office of Energy and Environmental Affairs (EEA)'s Certificate on the Notice of Project Change (NPC). The Final EIR/EA was filed on March 1, 2010. An extended public comment period closed on May 24, 2010. The Secretary's Certificate was issued on May 28, 2010, with finding that the Final EIR adequately and properly complied with the Massachusetts Environmental Policy Act (MEPA). The Federal Aviation Administration (FAA) issued a Finding of No Significant Impact (FONSI) on March 1, 2010. This project was completed in late 2014 and the RCC achieved Leadership in Energy and Environmental Design® (LEED®) Gold certification in 2016. The SWSA Airport Edge Buffer was completed in late 2014.
2. Logan Airport RPZ Enhancements Equipment Storage and Maintenance Facility (ESMF) Relocation Massport is evaluating safety enhancements in the RPZ at the approach end of Runway 15R. This area includes hangars, aircraft parking, the North Gate, aircraft fueling facilities, and other airfield maintenance support facilities.	Massport is working with FAA to study the feasibility of implementing RPZ enhancements including reorganization of buildings and uses in this area. Environmental review of this project is expected to proceed in 2021.
3. Jet Fuel Storage Addition – NSA Massport proposes to enhance the reliability of jet fuel storage availability and distribution to meet current demand at Logan Airport by installing additional jet fuel storage facilities within the existing storage and distribution system. The proposed location for these additional facilities is the site of an abandoned Massport water pumping station, located on Prescott Street adjacent to the rear of the Economy Garage. The functions, facilities, and land use in the project area will remain generally consistent.	Massport is advancing plans and permitting to add a fifth jet fuel storage tank immediately adjacent to the existing tanks and fuel distribution facilities. Construction is anticipated to begin in 2022.

Table 3-5 Description and Status of Projects/Planning Concepts in the Service Areas (October 31, 2020) (Continued)

Description	Status
Massport Projects/Planning Concepts	
4. Governors Island Equipment Storage Governors Island has been identified for a number of aviation support activities for many years. The area has been considered as a future location of RON aircraft parking, and potentially other uses (including cold storage).	Massport continues to evaluate concepts for Governors Island.
5. Relocated Compressed Natural Gas (CNG) Station in the North Cargo Area (NCA) (location to be determined) This would relocate Massport's existing CNG Station to accommodate the airside operations in the NCA.	Massport continues to examine potential on-Airport parcels for relocation of the existing CNG station. Relocation is not expected to occur before 2021.
Tenant Projects/Planning Concepts	
6. Replacement Cargo Facilities in the NCA (location to be determined) Construction of new cargo facilities in the NCA would compensate for the loss of cargo facilities due to the Central Artery/Tunnel (CA/T) Project, as well as for the projected growth in cargo demand.	The project remains under evaluation. If a decision were made to proceed with this project, construction would likely commence after 2025.
7. Joint Operations Center (JOC) (location to be determined) The JOC is envisioned as a state-of-the-art operations and situational awareness center. The goal of the JOC is to capture the security and response benefits afforded through integrated incident dispatch and mobile response for public safety and security services. The program plans to bring the Operations Center, State Police Dispatch, Maritime Monitoring (with future Hanscom Field and Worcester Regional Airport monitoring), Transportation Security Administration (TSA) staff, and camera monitoring within the structure of one common facility.	Development of a common command and control JOC is in the feasibility phase

Source: Massport.
Note: See **Figure 3-6** for the location of service area projects/planning concepts.

Airport Buffer Areas and Open Space Planning

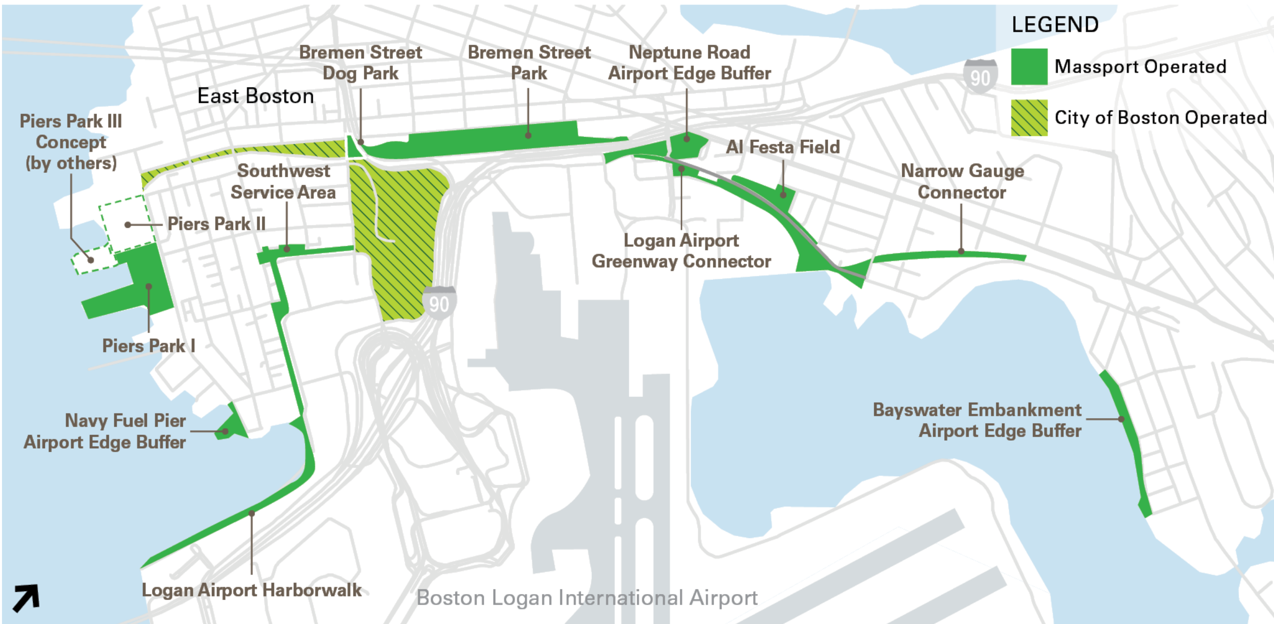
Previously, Massport committed over $15 million for the planning, construction, and maintenance of four Airport edge buffer areas and two parks along Logan Airport's perimeter (**Figure 3-7**). These buffers have been completed and include the Bayswater Embankment Airport Edge Buffer, Navy Fuel Pier Airport Edge Buffer, SWSA Airport Edge Buffer, and Neptune Road Airport Edge Buffer. These areas are located on Massport-owned property along Logan Airport's perimeter boundary and provide attractive landscape buffers between Airport operations and adjacent East Boston neighborhoods. The buffer design included consultation with Logan Airport's neighbors and other interested parties in an open community planning process. Today, East Boston enjoys 3.3 miles and more than 33 acres of green space developed or managed by Massport, in partnership with and in response to the East Boston community.

In September 2016, Massport officially opened the Bremen Street Dog Park. The park, the first of its kind in East Boston, provides 22,655 square feet of play space for neighborhood dogs. Other park amenities include exercise equipment for dogs, pet waste stations, and water fountains for both pets and their owners. Massport completed the construction of the Greenway Connector between Bremen Street Park and an overlook at Wood Island Marsh in March 2014. The one-half mile Greenway Connector connects the pedestrian/bicycle path to the City of Boston/Narrow-Gauge Connector to Constitution Beach. In 2016, construction on the Narrow-Gauge Connector was underway by the City of Boston. The Narrow-Gauge Connector is a one-third mile multi-use path and extension of the East Boston Greenway network which allows pedestrians and cyclists to travel between Piers Park and Constitution Beach. Massport assumed ownership and operation of the Narrow-Gauge Connector when it was completed in 2016.

As part of the Logan Impact Advisory Group (LIAG), Massport committed to developing Piers Park II, which will add approximately 4.2 acres of green space to the East Boston waterfront upon completion. The conceptual design of the Phase II site envisions a fully accessible park with a central lawn area, basketball and volleyball courts, and bicycle and rollerblade tracks. A Request for Proposals for design of Piers Park Phase II was issued by Massport in June 2017. The planning and design process is underway with the East Boston community.

Piers Park Phase III is conceived as a 3.8-acre addition of green space to the existing Piers Park on the East Boston waterfront. The Phase III site is located adjacent to the Phase II site, along Marginal Street in East Boston. Piers Park Phase III is an early-stage planning concept that Massport has made available to external developers. Piers Park Phase III would turn an aging pier into a 3.6-acre greenspace that includes resiliency features to help protect the neighborhood from flooding and sea level rise. Massport issued a Request for Proposals (RFP) in February 2018 for design and construction of Piers Park Phase III. In 2020, The Trustees of Reservations were selected to advance planning and permitting for this facility. Initial site feasibility studies are underway, as is stakeholder outreach.

Figure 3-7 Parks Operated by Massport and City of Boston



Source: Massport, VHB.

To collaborate in East Boston open space planning, Massport also participates in meetings with other agencies including the Massachusetts Department of Transportation (MassDOT), the City of Boston, and the MBTA. **Table 3-6** describes the status of ongoing buffer projects and other Massport green space projects under consideration as of 2020. **Figure 3-8** shows the location of these buffer projects.

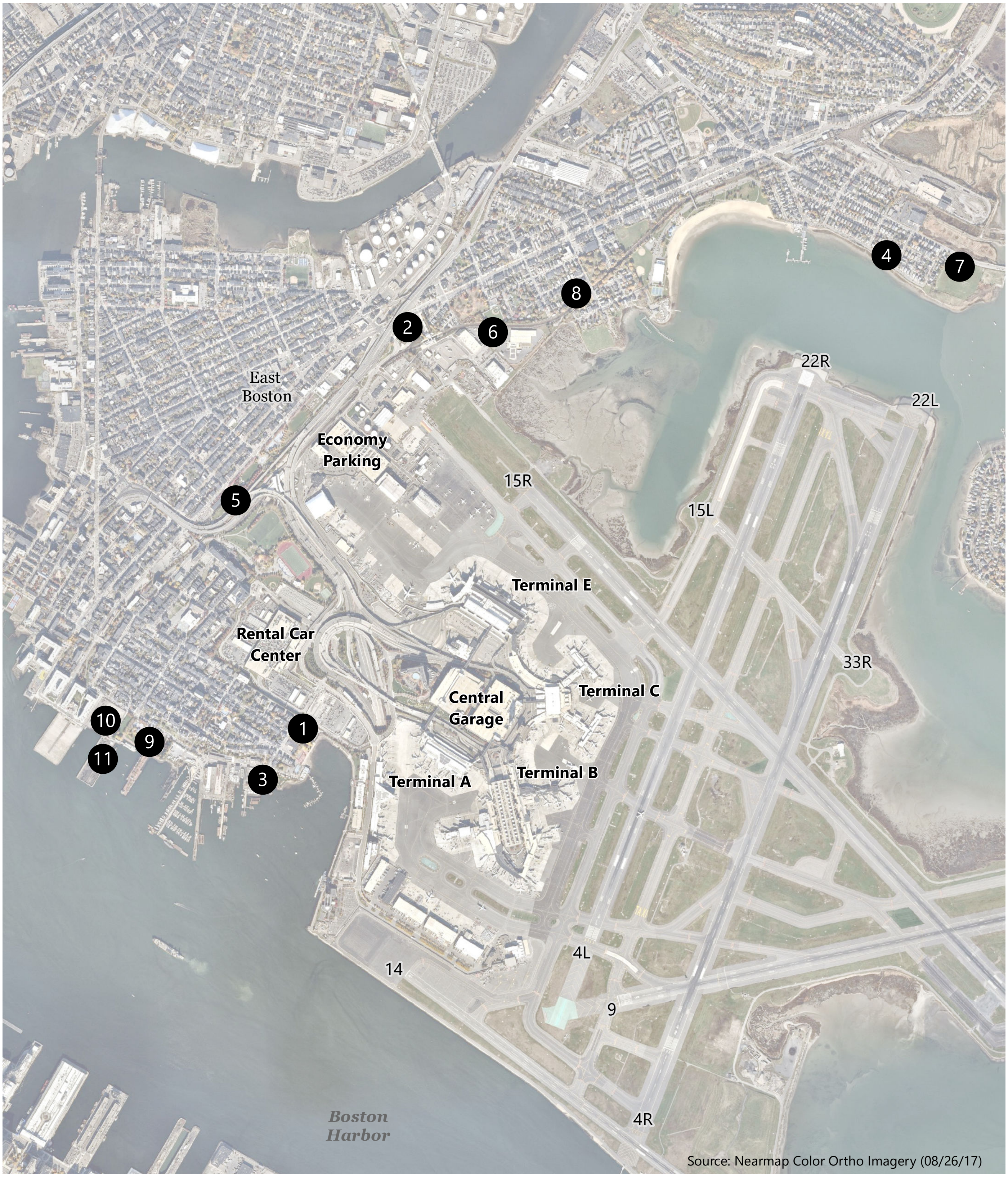


FIGURE 3-8 Location of Airport Buffer Projects/Open Space

Notes: See Table 3-6 for a description of the numbered projects. Status as of October 31, 2020.

1. SWSA Airport Edge Buffer (Phases I and II) (complete)
2. Neptune Road Airport Edge Buffer (complete)
3. Navy Fuel Pier Airport Edge Buffer (complete)
4. Bayswater Embankment Airport Edge Buffer (complete)
5. Bremen Street Park and Dog Park (complete)
6. Greenway Connector (complete)
7. Community Greenway Enhancements (complete)
8. Narrow-Gauge Connector (complete)
9. Piers Park Phase I (complete)
10. Piers Park Phase II
11. Piers Park Phase III (by others)

Table 3-6 Description and Status of Airport Edge Buffer Projects/Open Space (October 31, 2020)

Description	Status
1. Southwest Service Area (SWSA) Airport Edge Buffer (Phases I and II)	
Phase I involved the construction of an approximately half-acre area with landscaping and lighting improvements along Maverick Street that included evergreen and deciduous trees, ornamental shrubs, and groundcovers.	Phase I construction was completed in 2006.
Phase II consisted of landscaping (i.e., densely planted or planted atop earth berms for enhanced separation) and solid barriers such as fences and walls. The project enhanced bicycle and pedestrian connectivity between Maverick Street and East Boston Memorial Park and Stadium with extensive landscaping including trees, shrubs, flowering perennials, and decorative fences.	Phase II of the SWSA Airport Edge Buffer design was integrated with the SWSA Redevelopment Program and was completed in Fall 2014.
2. Neptune Road Airport Edge Buffer	
The Neptune Road Airport Edge Buffer is a Massport community mitigation project to buffer the East Boston Neighborhood at Logan Airport's northwestern edge. The 1.5-acre parcel is at the nexus of Neptune Road, Vienna, and Frankfort Streets and is adjacent to the Massachusetts Bay Transportation Authority's (MBTA) Wood Island Station. The majority of the parcel is located within the Runway 15R-33L Runway Protection Zone (RPZ) which limits the type of active uses in this area. The project consists of Olmsted-inspired landscape with interpretive elements that complement the adjacent North Service Area Roadway Corridor and serves as a continuation of the pedestrian/bicycle path to Bennington Street.	The Neptune Road Airport Edge Buffer was completed in June 2016.
3. Navy Fuel Pier Airport Edge Buffer	
The Navy Fuel Pier Airport Edge Buffer project began with the U.S. Army Corps of Engineers' remediation of the former Navy Fuel Pier, which was completed in 2001. The project involved beautification of this 0.7-acre property through landscape improvements and stabilization of the waterfront perimeter. An interpretive panel was also installed which details the history of the surrounding area.	Construction of the Navy Fuel Pier Airport Edge Buffer was completed in 2007.
4. Bayswater Embankment Airport Edge Buffer	
This project involved creating a landscaped buffer between Bayswater Street and Boston Harbor.	Construction of this Airport edge buffer was completed in 2003. Massport is evaluating options for repairing recent storm-related shoreline damage.
5. Bremen Street Park and Dog Park	
The 18-acre park was constructed as part of the Central Artery/Tunnel (CA/T) Project. The park, which is the second largest neighborhood park in East Boston, offers a variety of facilities, a direct pedestrian connection to the MBTA Blue Line Airport Station, and a half-mile segment of the three-mile East Boston Greenway. The park was built on land previously used as a rail yard and later off-Airport parking. a nearly half-acre dog park is located on the corner of Bremen and Porter Streets.	Construction of the park was completed in 2008. Massport continues to operate the park and provide community facilities. The Dog Park was opened in September 2016.
6. Greenway Connector	
The one-half mile pedestrian/bicycle path connects the Bremen Street Park pedestrian/bicycle path to the Narrow-Gauge Connector. Together the Greenway and Narrow-Gauge Connectors provide a continuous path connecting Piers Park, Bremen Street Park, Stadium Park, and Constitution Beach.	Construction of the Greenway Connector between Bremen Street Park and an Overlook at Wood Island Marsh was completed by Massport in 2014.

Table 3-6 Description and Status of Airport Edge Buffer Projects/Open Space (October 31, 2020) (Continued)

Description	Status
7. Community Greenway Enhancements	
Eight street lights were installed along Saratoga Street to improve safety and maintain spacing consistent with what was existing.	The lighting improvements were completed in December 2015.
8. Narrow-Gauge Connector	
The Narrow-Gauge Connector is a one-third mile multi-use path and extension of the East Boston Greenway network. This portion of the East Boston Greenway allows people to continuously walk from Piers Park to Constitution Beach.	Construction by the City of Boston was started in 2015 and the Narrow-Gauge Connector was opened in May 2016. The City of Boston completed final plantings in Spring of 2016 and turned the project over to Massport for ownership and continuing maintenance, and security.
9. Piers Park Phase I	
Formerly a 7-acre industrial site located on the East Boston waterfront, the Phase I site is comprised of three distinct zones: 5.5-acre backland, 1.2-acre pier, and a community sailing facility. The park includes a picnic area, adult fitness course, children's playground and spray park, and an outdoor amphitheater.	Construction was completed in 1995.
10. Piers Park Phase II	
Piers Park Phase II will add 4.2 acres of green space to the existing Piers Park on the East Boston waterfront. The Phase II site is located adjacent to the Phase I site, along Marginal Street. The conceptual design of the Phase II site envisions a fully accessible park with a central lawn area, basketball and volleyball courts, and bicycle and rollerblade tracks. Massport has committed up to $15 million for the design and construction. This new park is expected to offer resiliency landscape features similar to those in the Phase I Park, including brick paved walkways, site furniture, lighting, and plantings. Elevation of the site is also planned to improve neighborhood resiliency and flood damage protection. A new 1,000-square foot community/sailing center, located on the waterfront, is designed to replace the existing Sailing Center building while providing additional meeting spaces for the community.	Massport issued a Request for Proposals for design of Piers Park Phase II in June 2017. The planning and design process is underway and is expected to be completed in 2021.
11. Piers Park Phase III (*by others*)	
Piers Park Phase III is conceived as a 3.8-acre addition of greenspace to the existing Piers Park on the East Boston waterfront. The site is located adjacent to the Phase II site, along Marginal Street in East Boston. Piers Park Phase III would turn an aging pier into a 3.6-acre greenspace that includes resiliency features to help protect the neighborhood from flooding and sea level rise.	Massport issued a Request for Proposals in February 2018 for design and construction of Piers Park Phase III. In 2020, The Trustees of Reservations was designated by Massport a developer of the park. Initial site feasibility studies and stakeholder outreach commenced in 2020 and overall planning is underway. Concept design and permitting is expected to take several years.

Source: Massport.
Note: See **Figure 3-8** for the location of Airport edge buffer projects/planning concepts.

Energy, Resiliency, and Sustainability Planning

As part of an authority-wide initiative, Massport recently completed or is undertaking several airport-wide energy, resiliency, and sustainability planning efforts described below.

Energy Planning

Massport has a long-standing energy management program committed to supply side wholesale energy management and procurement and demand side energy efficiency and renewable energy development. Supply side wholesale purchasing is managed through an inter-departmental advisory group consisting of representatives of Administration and Finance, Building Operations, and Capital Programs and Environmental Affairs. Procurement is guided by a Board approved Energy Hedge Policy. Demand management is pursued through individual capital projects and stand-alone measures, where feasible, including investments in high efficiency lighting, automated building energy management systems, and micro-grids. Renewable energy planning has taken the form of a Massport-wide evaluation of feasible third-party financed renewable energy development sites designed for coordination with the Commonwealth of Massachusetts SMART (Solar Massachusetts Renewable Target Program). As part of this evaluation, all Massport properties were vetted for potential solar development. A single solar project resulted from this analysis, the Worcester Regional Airport project, which has subsequently been advertised and awarded. Project development of the Worcester project will continue under a public/private partnership.

Massport will continue to evaluate renewable energy development potential across all of its properties. Massport has numerous existing self-financed solar panel installations at Logan Airport and Hanscom Field, including locations on top of the Economy Garage, Rental Car Center, Terminal A, Hanscom Civil Air Terminal, and Terminal B Garage. Solar development continues to be integrated into new construction projects including the Terminal E Modernization Project which includes a planned 300,000-kilowatt hour (kWh) rooftop solar array in the second phase of the project. The Terminal C Canopy project is planned to include a rooftop solar array. In addition, Massport will install solar panels at the planned new Terminal E parking garage when that project proceeds. Previously, Massport formed a public/private partnership to develop its largest existing solar installation, 357kW, on the roof of Terminal A and Terminal A Satellite. This project was undertaken as part of a statewide solicitation designed to facilitate American Recovery and Reinvestment Act (ARRA) grant funding development of solar energy in the Commonwealth of Massachusetts

In 2018, the EPA awarded a $541,817 grant to Massport to replace diesel powered GSE at Logan Airport. This grant will be used in conjunction with an FAA VALE grant Massport received in the fall of 2018, to install eGSE charging stations as part of the Terminal B Optimization Project. On the landside, Massport has installed electric charging facilities in all its garages and will also install them in the proposed new garage in front of Terminal E and the expanded Economy Garage when those projects proceed.

Resiliency Planning

Massport has a robust effort underway that first identified coastal storm and climate change vulnerabilities on the Airport and has incorporated resilient infrastructure design standards for all types of Airport projects. At the end of 2013, Massport initiated a Disaster and Infrastructure Resiliency Planning Study (DIRP) for Logan Airport,

the Port of Boston, and Massport's waterfront assets in South and East Boston. The DIRP Study includes a hazard analysis, models of sea-level rise and storm surge, and projections of temperature and precipitation and anticipated increases in extreme weather events. The DIRP Study provides recommendations regarding short-term strategies to make Massport's facilities more resilient to the likely effects of climate change. The study was completed and implementation of adaptation initiatives began in late 2014.

In addition to the DIRP Study and its related initiatives, Massport has completed an Authority-wide risk assessment, as part of its strategic planning initiative; issued a Floodproofing Design Guide; and has developed a resilience framework to provide consistent metrics for short- and long-term planning and protection of its critical facilities and infrastructure. Beyond infrastructure resiliency, Massport is also focused on incorporating social and economic resilience into its long-term operational and capital planning. Massport's Floodproofing Design Guide was published in November 2014, and updated in November 2018.

Operational aspects of resiliency strategy include the development of Flood Operations Plans for Logan Airport and Massport maritime facilities. These plans were introduced in 2014 and included the planned deployment of temporary flood barriers to protect up to 12 locations of critical infrastructure in the event of severe weather. The test deployments and live event staging for the March 2018 Nor-easters succeeded in managing and tracking flood barrier deployment logistics and effective communication. As a result, Logan Airport's Flood Operations Plans and operational responses have evolved. A web-based coastal flood resiliency application was developed to better manage planning immediately prior to an event impact, and to facilitate operational response and recovery as quickly as possible.

Additional locations have been permanently enhanced to prevent flooding. The flood operations plans are evaluated annually to enhance their effectiveness and to adapt to evolving requirements and past experiences. As reported in the *Sustainable Massport 2019 Annual Sustainability and Resiliency Report*, 100 percent of critical assets such as electrical power facilities, diesel fuel pumping stations, telecommunications systems, and police and fire public safety buildings have been enhanced with resiliency measures. Floodproofing measures include: installing temporary flood barriers for facilities, raising electrical and mechanical equipment above forecasted flood levels, sealing and waterproofing openings and conduits; installing water sensors and pumps, and installing anchoring systems for the deployment of temporary flood fencing and flood barriers in the event of an emergency.

In 2017, Massport conducted a series of workshops with key stakeholders to review and continuously improve its Flood Operations Plans. In addition, many education and training opportunities have been provided to staff and emergency responders to increase operational preparedness for flood events. In March 2018, Massport conducted several test deployments of flood barriers at three critical Logan Airport assets. Additionally, Massport developed a flood resiliency application to inform decision-making, facilitate management oversight, and enable real-time field updates via mobile devices before, during, and after storm events.

Logan Airport Sustainability Planning

In 2013, Massport was awarded a grant by FAA to prepare a Sustainability Management Plan (SMP) for Logan Airport. The Logan Airport SMP planning effort began in May 2013 and was completed in April 2015. The purpose of the Logan Airport SMP is to enhance the efficiency and sustainability of Logan Airport's operations

and to support the broader sustainability principles of the Commonwealth. The Logan Airport SMP takes a comprehensive approach to sustainability including economic vitality, social responsibility, operational efficiency, and natural resource conservation considerations. The Logan Airport SMP is intended to promote, integrate, and coordinate sustainability efforts across the Authority. The Logan Airport SMP was developed with a framework and implementation plan, with metrics and targets designed to track progress over time. Massport is currently advancing a series of short-term initiatives to help reach its goals in the areas of energy and greenhouse gas emissions; community, employee, and passenger well-being; resiliency; materials, waste management, and recycling; and water conservation.

Massport Annual Sustainability and Resiliency Report

The Massport Annual Sustainability and Resiliency Report provides a progress summary of sustainability efforts at Logan Airport and other Massport facilities, based on Massport's sustainability goals and targets established in the Logan Airport SMP. The first report, titled the *Logan Airport Annual Sustainability Report*, was published in April 2016 and focused on Logan Airport only. Since the publication of the first report, Massport has continued expanding its sustainability initiatives, with an increased focus on implementing resiliency measures to protect Maritime and Logan Airport operations, critical infrastructure, and workforce. The lastest Annual Sustainability and Resiliency Report highlights Massport's progress towards improving sustainability and enhancing resiliency at its facilities and is available on Massport's website at: http://massport.com/massport/business/capital-improvements/sustainability/sustainability-management/.

Annual Sustainable Massport Calendar

Each year since 2015, Massport distributes *Sustainable Massport* calendars to employees and other stakeholders. The calendars are filled with examples of Massport's sustainability projects and successes, and each month highlights aspects of environmental, social, and economic aspects of sustainability to which employees can contribute.

Source: Massport.

Sustainable Massport 2.0

Massport is continuing to incorporate sustainability considerations into its projects and is currently working on a vision for Massport "Sustainable Massport 2.0." The vision for this next-level planning effort is to implement principles and approaches from the Logan Airport SMP at other Massport facilities and to update Massport's sustainability goals and targets. In early 2019, Massport conducted a series of charrettes with Massport staff, tenants, and business partners to help define this vision. Massport is currently working on a detailed set of recommendations for Sustainability 2.0. Updates will be reported in future Annual Sustainability and Resiliency Reports.

4

Regional Transportation

During the 2018/2019 period, Boston Logan International Airport (Logan Airport or the Airport) (and the aviation industry in general) continued to see the strong growth experienced over the past few years. However, the COVID-19 pandemic, which began to be felt in mid-March 2020, has reversed this trend with dramatic reductions in passenger levels and flights at Logan Airport as well as the other regional airports. As of the filing of this *2018/2019 Environmental Data Report (EDR)*, Logan Airport continued to be one of the nation's airports experiencing the most dramatic reductions. As of October 2020, total flight operations for the year were down by 50 percent and passenger levels were down by about 70 percent compared to January through October 2019.

Activity levels at the regional airports including Manchester-Boston Regional Airport in New Hampshire and T.F. Green Airport in Warwick, Rhode Island experienced significant drops in passenger activity between 95.0 and 96.9 percent at the height of the pandemic in April 2020. These airports have recovered at slightly better rates than Logan Airport since they are less dependent on international travel. Over the 2020 Thanksgiving weekend, there were 147,900 travelers combined at six major New England airports from Friday through Wednesday — down more than 70 percent compared to the same time period last year, when nearly 500,000 people headed to those airports, according to Transportation Security Administration officials. The upcoming *2020 EDR* will address the substantial changes in the regional transportation network.

Key Findings for 2018 and 2019

- In 2018 and 2019, the New England region saw an increase in air passenger activity. Regional air passengers increased by 6.5 percent to 58.3 million air passengers in 2018 and then another 2.5 percent to 59.7 million in 2019, a historic high. The 10 regional airports (excluding Boston Logan International Airport [Logan Airport or the Airport]) in New England accommodated 17.3 and 17.2 million air passengers in 2018 and 2019, respectively, compared to 16.3 million passengers in 2017.
- Worcester Regional Airport, T.F. Green Airport, Portland International Jetport, Burlington International Airport, and Bangor International Airport saw an overall increase in commercial service operations since 2017. Manchester-Boston Regional, Tweed-New Haven, Bradley International, and Portsmouth International airports saw reduced service offerings since 2017.
- The Massachusetts Port Authority's (Massport's) three airports, Logan Airport, Worcester Regional Airport, and Hanscom Field, make significant contributions to the regional economy, generating approximately $23.1 billion annually, or 94 percent of the overall economic benefits generated by the Massachusetts airport system.
- Worcester Regional Airport passenger numbers increased by 76 percent in 2019 compared to 2017 and reported a total of 817,057 cumulative passengers from 2013 to 2019. In the past five years, Worcester Regional Airport experienced an average growth rate of 10 percent per year.
- Massport continues to invest in Worcester Regional Airport—together with the City of Worcester, Massport has already initiated a $100 million, 10-year investment to revitalize and attract commercial operations to Worcester Regional Airport.
    - Recently, Massport installed a Category (CAT) III Instrument Landing System (about $32 million) paid for by federal grants and Massport funds.
    - jetBlue Airways, American Airlines, and Delta Air Lines announced new service to New York John F. Kennedy International Airport (JFK), Philadelphia International Airport, and Detroit Metropolitan Wayne County Airport, respectively.
- Hanscom Field is a reliever airport to Logan Airport and is the second busiest airport in New England.
- Amtrak rail system-wide ridership increased from 31.7 million customer trips in fiscal year (FY) 2018 to 32.5 million trips in FY 2019. In FY 2018, the Northeast Corridor (NEC) carried over 12 million passengers, up about 1 percent from the prior year. In FY 2019, the NEC carried 12.5 million passengers on those services, up about 3 percent from the prior year.

Introduction

Logan Airport plays an important role in the New England region's intermodal transportation system. This chapter reports on the status of the region's airports and other intermodal facilities. While the focus of the chapter is describing the regional system and Logan Airport's role in 2018 and 2019, significant updates in 2020 are also presented.

Logan Airport is the centerpiece of the three airports owned and operated by Massport. It is the primary international and domestic airport operating within the network of New England regional airports.[1] Massport also owns and operates Worcester Regional Airport and Hanscom Field; both of which play important roles in the New England regional transportation system, as described below. This chapter focuses on 2018 and 2019 and describes passenger and aircraft operations activity levels at New England regional airports,[2] including consideration of:

- Changes in airline service levels and other factors that have contributed to trends in regional airport activity;
- The status of current improvement plans and projects at the regional airports;
- Massport's initiatives and joint efforts with other transportation agencies to improve the efficiency of the New England regional transportation system; and
- Regional long-range transportation planning efforts.

New England Regional Airports

As shown in **Figure 4-1**, the New England region is anchored by Logan Airport and a system of 10 other commercial service, reliever, and general aviation (GA) airports (regional airports).[3] Together, these 11 airports accommodated 58.1 million passengers in 2018 and 59.6 million passengers in 2019, approximately 99 percent[4] of New England's air travel demand. These airports include:

- Logan Airport (BOS)
- Worcester Regional Airport (ORH)
- Hanscom Field (BED)
- Bradley International Airport (BDL)
- T.F. Green Airport (PVD)
- Manchester-Boston Regional Airport (MHT)
- Portland International Jetport (PWM)
- Burlington International Airport (BTV)
- Bangor International Airport (BGR)
- Tweed-New Haven Airport (HVN)
- Portsmouth International Airport (PSM)

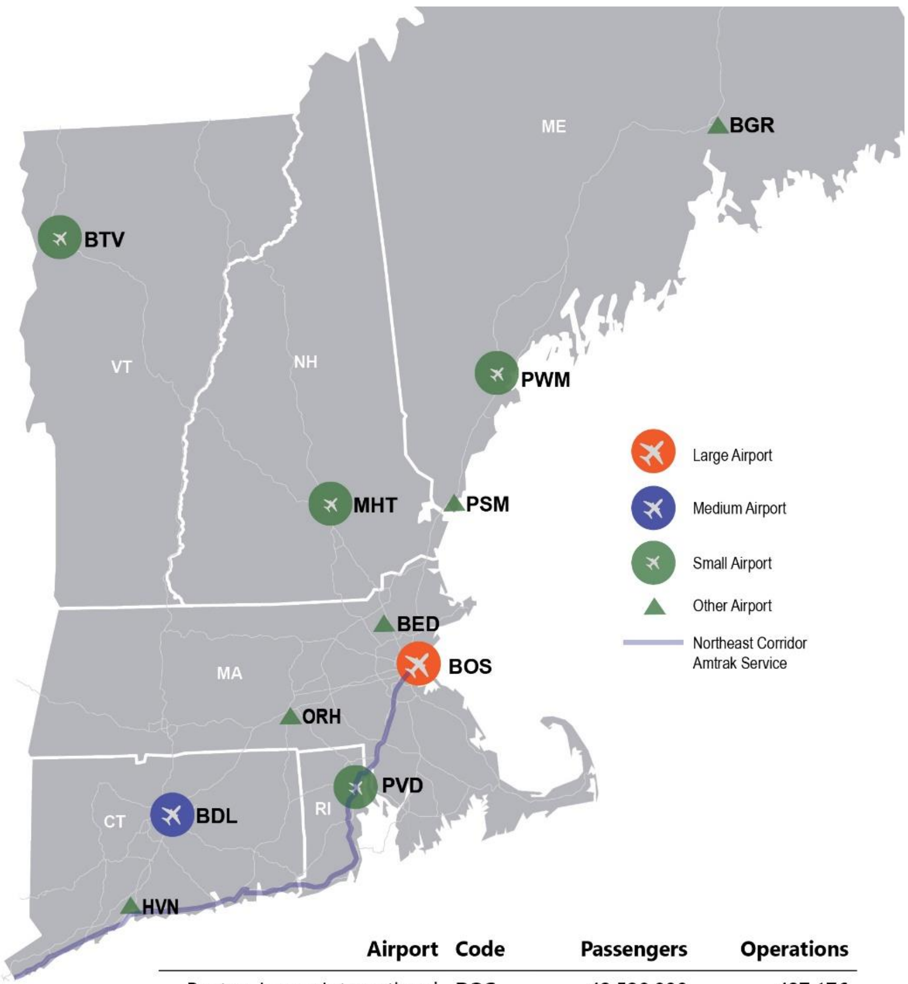
1 A regional airport is an airport serving traffic that supports regional economies by connecting communities to statewide and interstate markets.

2 A review of passenger and operations activity levels at Logan Airport is provided in Chapter 2, *Activity Levels*.

3 The *New England Regional Airport System Plan* (NERASP), which was published by the Federal Aviation Administration in 2006, includes Logan International Airport and these 10 regional airports: Bangor International, Bradley International, Burlington International, Hanscom Field, Manchester-Boston Regional, Portland International, Portsmouth International, T.F. Green, Tweed-New Haven, and Worcester Regional airports.

4 Federal Aviation Administration. 2019. Final Calendar Year (CY) 2019 Passenger Boarding Data.

Figure 4-1 New England Regional Transportation System – 2018/2019 Passenger and Operations Activity Levels at the 11 Commercial Service Airports



Airport	Code	Passengers	Operations
Boston-Logan International	**BOS**	42,520,000	427,176
T.F. Green	**PVD**	3,990,000	69,761
Bradley International	**BDL**	6,750,000	91,383
Manchester-Boston Regional	**MHT**	1,700,000	51,139
Burlington International	**BTV**	1,370,000	73,270
Portland International Jetport	**PWM**	2,180,000	58,232
Portsmouth International	**PSM**	120,000	41,545
Hanscom Field	**BED**	20,000	128,671
Worcester Regional	**ORH**	190,000	20,763
Tweed New Haven Regional	**HVN**	100,000	28,430
Bangor International	**BGR**	610,000	45,600

Source: Federal Aviation Administration (FAA). 2019. *Passenger Boarding Data*. https://www.faa.gov/airports/planning_capacity/passenger_allcargo_stats/passenger/

Note: Airport sizes are based on the FAA definition: Large Hub (1 percent or more of U.S. annual passenger boardings), Medium Hub (at least 0.25 percent, but less than 1 percent), Small Hub (at least 0.05 percent, but less than 0.25 percent); Other (Nonhub Primary – more than 10,000, but less than 0.05 percent).

Logan Airport serves a major domestic origin and destination (O&D)[5] market and is the primary international gateway for the region. The regional airports range in role and activity levels, from Bradley International Airport, which served over 6.6 million commercial passengers in 2018 and over 6.7 million in 2019, to Hanscom Field, which does not currently handle any scheduled commercial flights but serves as New England's largest GA facility.

In addition to Logan Airport and the 10 regional airports shown in **Figure 4-1**, a third tier of commercial airports serves relatively isolated communities or provides seasonal or niche commercial air services in New England. These airports include:

- Hyannis Airport, Martha's Vineyard Airport, Nantucket Memorial Airport, New Bedford Regional Airport, and Provincetown Municipal Airport in Massachusetts;
- Augusta State Airport, Bar Harbor Airport, Rockland Airport, and Northern Maine Regional Airport in Maine;
- Lebanon Municipal Airport in New Hampshire;
- Block Island State Airport and Westerly State Airport in Rhode Island; and
- Rutland Southern Vermont Regional Airport in Vermont.

These third-tier airports support frequent commercial service to Logan Airport and, in some instances, T.F. Green Airport during the summer months. Most of these third-tier airports are not in close proximity to Logan Airport and are isolated due to geographic factors. Because of their remoteness and/or limited market areas, many of these airports are unlikely to attract passengers that now fly from Logan Airport. Instead, many of these airports are dependent on Logan Airport for connecting services.

Strong Regional Economy Drives Growth at Logan Airport

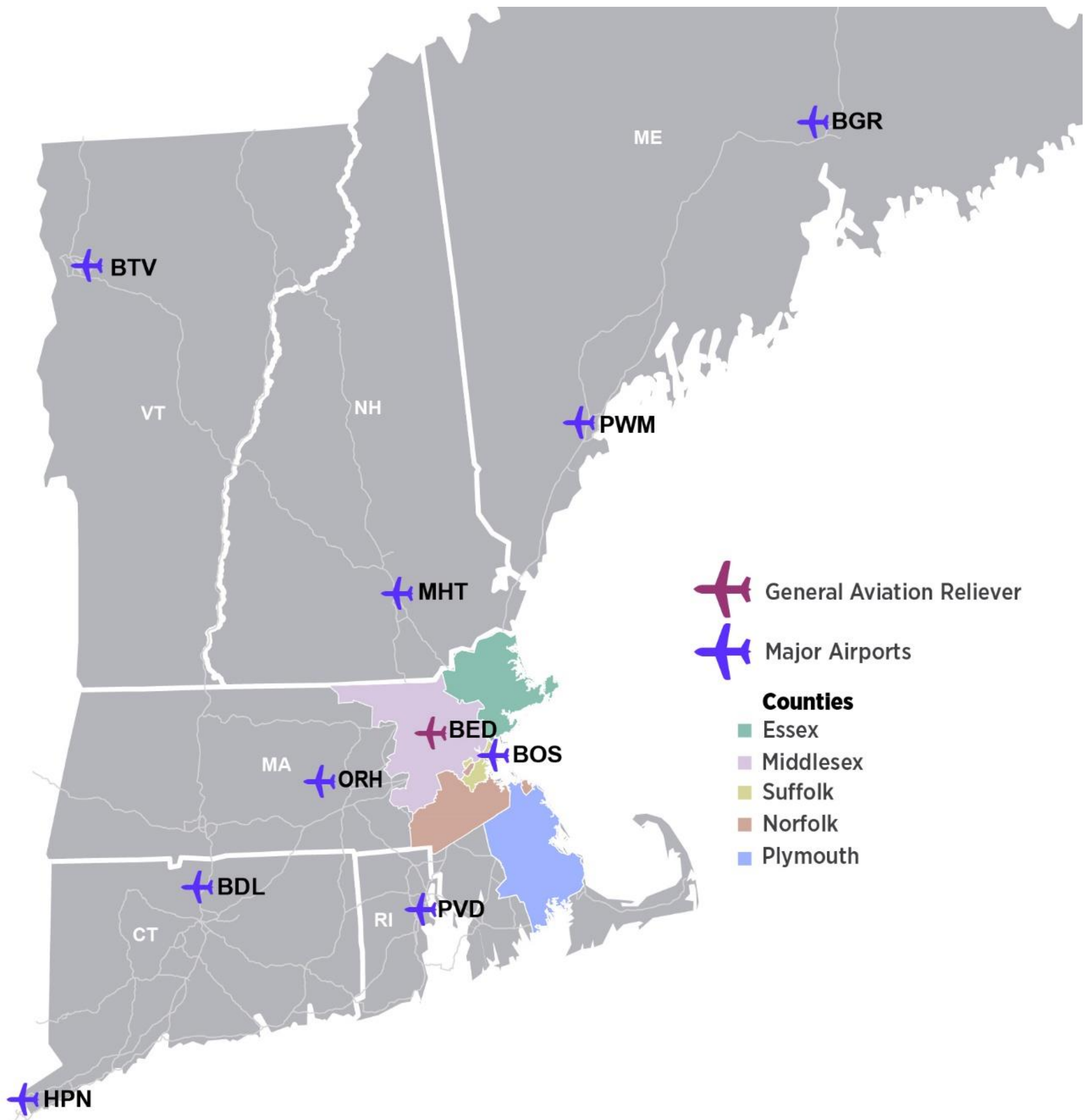
Through early 2020, the region surrounding Logan Airport had demonstrated strong economic growth over the last 10 years through early 2020. This regional economic growth was the primary drive of growth at Logan Airport and demonstrates the close relationship between the regional economy and Logan Airport activity. The 2019 Massachusetts Department of Transportation (MassDOT) Statewide Airport Economic Impact Study reported a 22-percent increase in total dollar economic output at Logan Airport from 2014 to 2019, which reflected increased contributions from visitor spending, airline and general aviation passenger traffic, new on-airport businesses, and returns on strategic investments. The robust regional economy drove Logan Airport's inbound and outbound passenger and cargo demand. Similarly, the Airport's air service enables businesses to serve customers outside of New England as well as tourists who use services provided by local businesses. Logan Airport is the predominant international airport in the region.

Logan Airport is the largest airport in the six-state New England region, which has a population of approximately 14.8 million residents (see **Figure 4-2**). The Airport is located in Massachusetts, which is home to approximately 6.9 million residents, or 46 percent of the total population of New England. The Airport serves

5 "Origin and destination" (O&D) traffic refers to the passenger traffic that either originates or ends at a particular airport or market. A strong O&D market like Boston generates significant local passenger demand, with many passengers starting their journey and ending their journey in that market. O&D traffic is distinct from connecting traffic, which refers to the passenger traffic that does not originate or end at the airport but merely connects through the airport en route to another destination.

passengers from across New England, with its primary catchment area consisting of five Massachusetts counties: Essex, Middlesex, Norfolk, Plymouth, and Suffolk (which includes the City of Boston). Approximately 4.4 million people reside in this five-county area (see **Table 4-1**).

Figure 4-2 Boston Logan International Airport Catchment Area



Source: VHB.

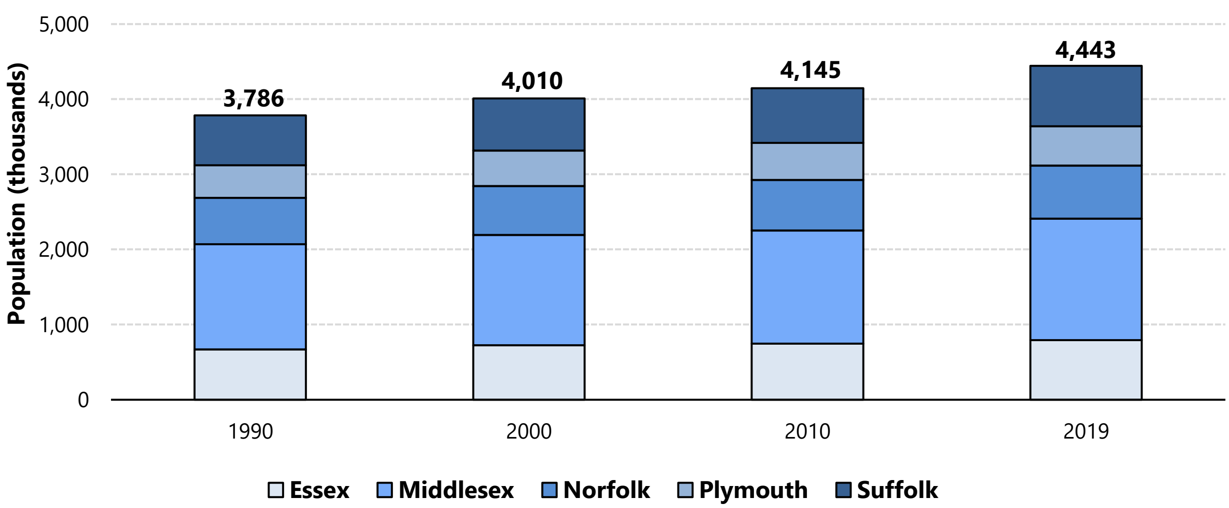
Notes: BDL – Bradley International Airport; BED – Lawrence G. Hanscom Field; BGR – Bangor International Airport; BOS – Boston Logan International Airport; BTV - Burlington International Airport; HPN – Westchester County Airport; MHT – Manchester-Boston Regional Airport; PVD – T. F. Green Airport; PWM – Portland International Jetport.

Table 4-1 Population of Logan Airport Primary Catchment Area, 1990, 2000, 2010, 2019

	Population (thousands)				Compound Annual Growth Rates		
County	**1990**	**2000**	**2010**	**2019**	**1990-2000**	**2000-2010**	**2010-2019**
Essex	671	725	746	792	0.8%	0.3%	0.7%
Middlesex	1,399	1,467	1,507	1,619	0.5%	0.3%	0.8%
Norfolk	617	651	672	706	0.5%	0.3%	0.5%
Plymouth	436	474	495	521	0.8%	0.4%	0.5%
Suffolk	663	693	725	804	0.4%	0.5%	1.2%
Boston Catchment Area	**3,786**	**4,010**	**4,145**	**4,443**	**0.6%**	**0.3%**	**0.8%**
Massachusetts	6,023	6,361	6,565	6,917	0.6%	0.3%	0.6%
New England	13,230	13,950	14,468	14,916	0.5%	0.4%	0.3%
U.S.	249,623	282,162	309,347	330,393	1.2%	0.9%	0.7%

Source: Woods & Poole Economics, Inc. 2019. Complete Economic and Demographic Data Source (CEDDS).
Note: Due to rounding, sums presented in the above figure may not add up precisely.

Figure 4-3 Logan Airport Primary Catchment Area Population Growth, 1990, 2000, 2010, 2019



Source: Woods & Poole Economics, Inc. 2019. Complete Economic and Demographic Data Source (CEDDS).

Logan Airport continued to experience rapid growth through 2019. However, beginning in early 2020 in the wake of the COVID-19 pandemic, the Airport experienced disproportionately lower passenger levels than a majority of the nation's larger airports. This dramatic drop in both domestic and international travel appears to be the result of several factors including reduced tourism, fewer students attending area colleges, restriction on business travel and the overall worldwide economic declines. Another reflection of the strength of the Airport's regional market was its relatively low unemployment rate during the reporting period. However, in 2020, it is important to note the effects of COVID-19 in Massachusetts, New England, and the entire globe in regard to economic health and payroll employment levels. The annualized Massachusetts real GDP declined 43.8 percent in the second quarter of 2020, which was greater than the nation's drop of 32.9 percent (largest in history for both). The GDP declined in Massachusetts to a greater extent than the U.S. as a whole because the Northeast was impacted earlier than other regions within the country[6] and the response of each state has been unique in terms of closures and restrictions to protect public health. Similarly, the unemployment rate in Massachusetts was among the highest of all states due to the pandemic. Although there has been some economic improvement during the third quarter of 2020, the full extent of the ongoing impact of COVID-19 will depend on future developments, including those outside the control of the airlines, related to possible increases in COVID-19 cases and/or new quarantine requirements being imposed in certain jurisdictions or other restrictions on travel, and the distribution of a vaccine, all of which are highly uncertain.

The *2020 EDR* will provide more context and understanding of the significant changes in the airline industry in general and for Logan Airport, in particular.

Prior to COVID-19, the Boston metropolitan area had consistently maintained a lower unemployment rate than that of the Commonwealth and the entire country (see **Figure 4-4**). In 2019, the Boston metropolitan statistical area had an unemployment rate of 2.6 percent, which is lower than both the rate in the Commonwealth (2.9 percent) and the country (3.7 percent). Even during the 2008/2009 economic downturn, Boston and the Commonwealth experienced unemployment rates below the national average.[7]

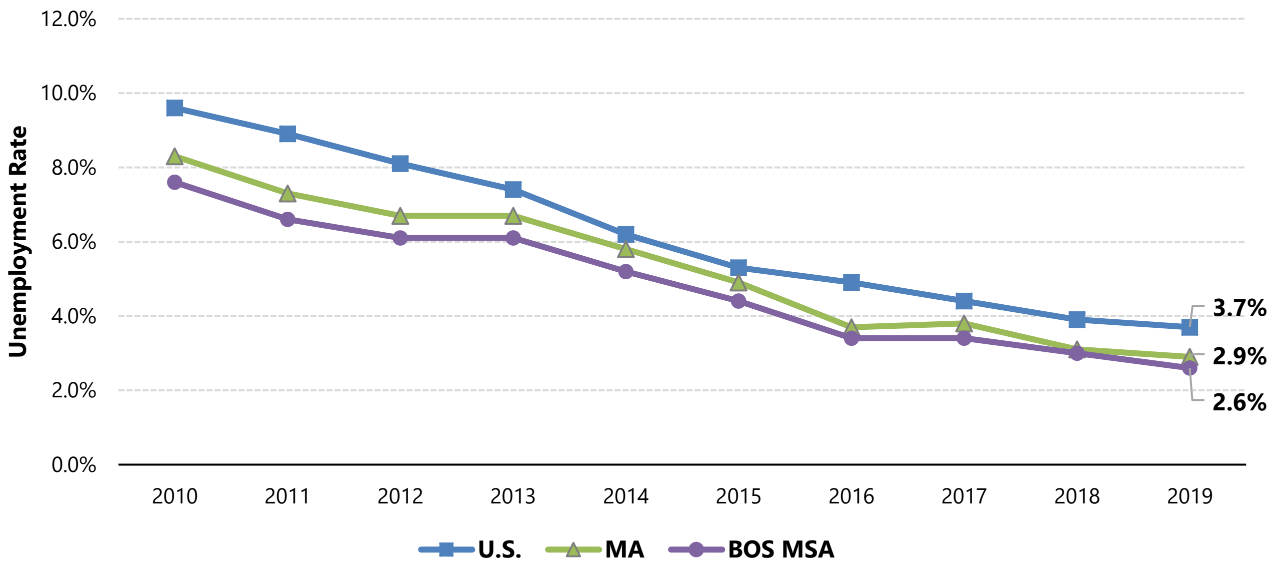
The Airport not only serves a growing population, but a high earning one as well. Per capita income in 2019 was estimated at $68,361 (2012 U.S. dollars) in the Airport's primary service area, 3.6 percent higher than the Commonwealth and 35.9 percent higher than the national average.[8]

6 MassBenchmarks. July 2020.

7 U.S. Bureau of Labor Statistics. 2020.

8 Woods & Poole Economics, Inc. 2019. ICF Analysis of Population and Personal Income Datasets.

Figure 4-4 Unemployment Rate Comparison: U.S., Massachusetts, and Boston Metropolitan Statistical Area (MSA), 2010–2019



Source: U.S. Bureau of Labor Statistics. 2020.

Logan Airport is a key transportation and economic resource in the New England region, the state, and the Boston metropolitan area, which is home to a broad range of industries. The industries accounting for the largest share of employees include: healthcare and social assistance; educational services; and professional, scientific, and technology services (which include Boston's thriving biotech industry).[9] In 2018 and 2019, Boston was ranked the #1 city in the U.S. for education, and #2 in healthcare.[10] The contribution of innovation and business start-ups in addition to the strong educational services and healthcare/biotech industries is also evident in the latest 2019 economic growth estimates. Furthermore, the Massachusetts economy saw 2.7 percent growth in 2019,[11] comparable to U.S. growth of 2.9 percent.[12]

9 U.S. Census Bureau via DataUSA. 2017. Boston-Cambridge, Newton, MA-NH Metro Area Profile. www.datausa.io.

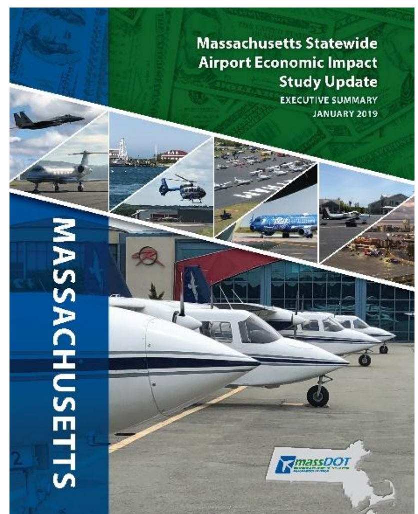
10 U.S. News & World Report 2020. Massachusetts

11 U.S. Bureau of Economic Analysis. 2020. Gross Domestic Product by State, Fourth Quarter and Annual 2019.

12 U.S. Bureau of Economic Analysis. 2020. Real Gross Domestic Product and Related Measures: Percent Change from Preceding Period.

Massachusetts Aviation Economic Impact Study

In addition to supporting the growth and economic success of the state, Logan Airport and the airport industry are important elements in the state and regional economy. The *Massachusetts Statewide Airport Economic Impact Study Update,* completed by the Aeronautics Division of MassDOT in 2014 and most recently updated in 2019,[13] assesses the contribution of the statewide airport system (the 39 public use airports, including Logan Airport) to the economy of Massachusetts. The analysis found that Massachusetts public use airports generated $24.7 billion in total economic activity (this includes on-Airport businesses, construction, visitor, and multiplier effects).[14] **Figure 4-5** shows the total impact of Massachusetts airports in terms of employment, payroll, and total output. In particular, the analysis noted that Massport's three airports make significant contributions to the regional economy, generating approximately $23.1 billion, or 94 percent of the overall economic benefits generated by the Massachusetts airport system. Specifically, Logan Airport supports over 162,000 direct and indirect jobs, while generating approximately $16.3 billion per year in total economic activity.[15] For every $100 spent by aviation-related businesses, an additional multiplier impact of $56 is created within Massachusetts, according to the study.



Massachusetts Statewide Airport Economic Impact Study Update, Report Cover.
Source: MassDOT

While the economic impact of the region's airports was the focus of the study, it also noted qualitative benefits of the state's airports including:

- Providing police support and partnerships with first responders;
- Improving unmanned aircraft systems activities and training curriculums;
- Supporting aerial surveying, photography, and inspection operations;
- Conducting search-and-rescue operations;
- Supporting the U.S. military and other government operations;
- Prompting tenants/private developers to fund new airport infrastructure; and
- Stimulating workforce development challenges in the aviation industry. [16]

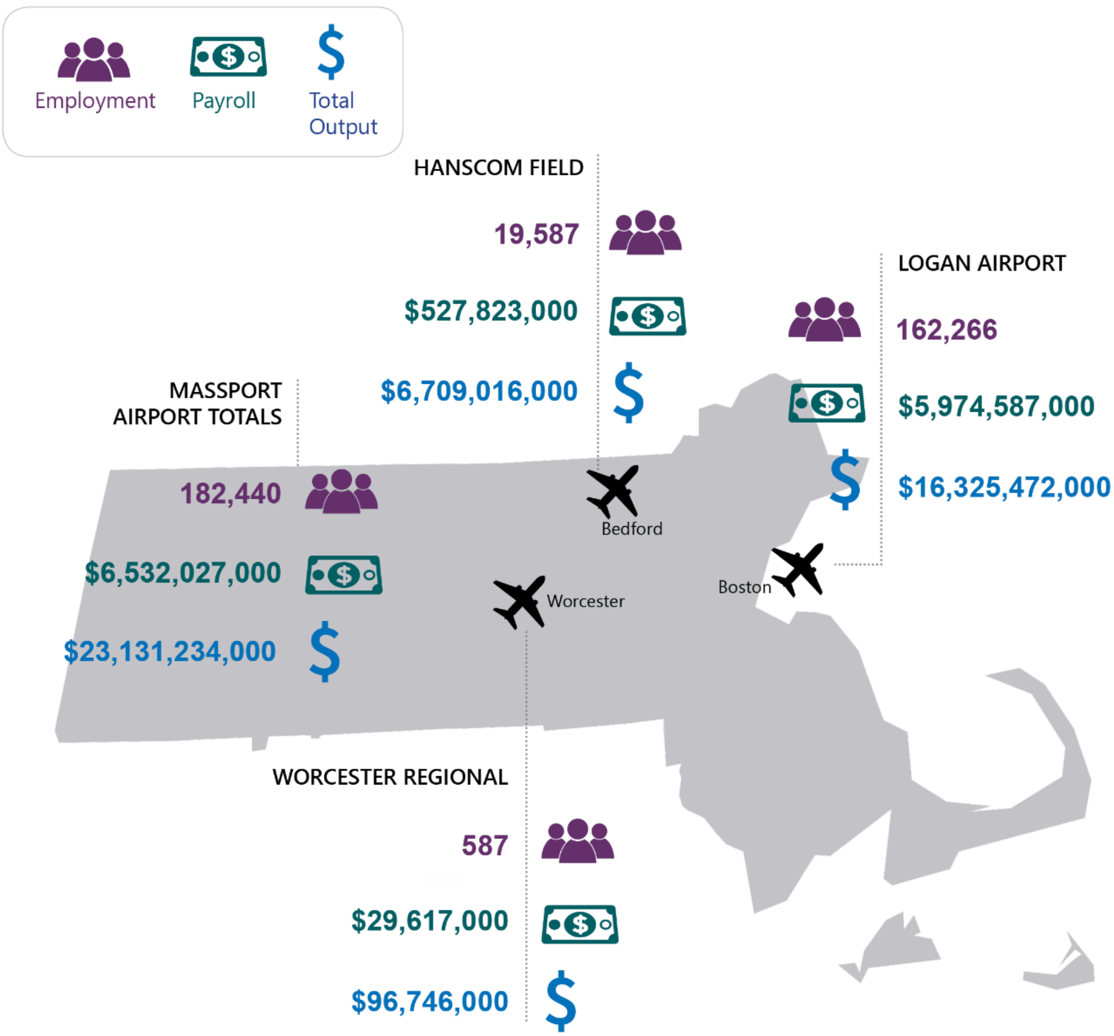
13 MassDOT. 2019. *Massachusetts Statewide Airport Economic Impact Study Update*. https://www.mass.gov/files/documents/2019/03/25/AeroEcon_ImpactStudy_January2019.pdf.

14 Multiplier effects refer to the recirculation of money in the local economy after initially being spent by the Airport, its tenants, or tourists. This recirculation increases the overall impact of the Airport's operation in the local economy.

15 MassDOT. 2019. *Massachusetts Statewide Airport Economic Impact Study Update*. https://www.mass.gov/files/documents/2019/03/25/AeroEcon_ImpactStudy_January2019.pdf.

16 *Ibid*.

Figure 4-5 Total Economic Impact of Massport Airports



Source: MassDOT, Massachusetts Statewide Airport Economic Impact Study Update, 2019.
Notes: "Massachusetts Totals" refers to the total economic output of all Massachusetts airports.

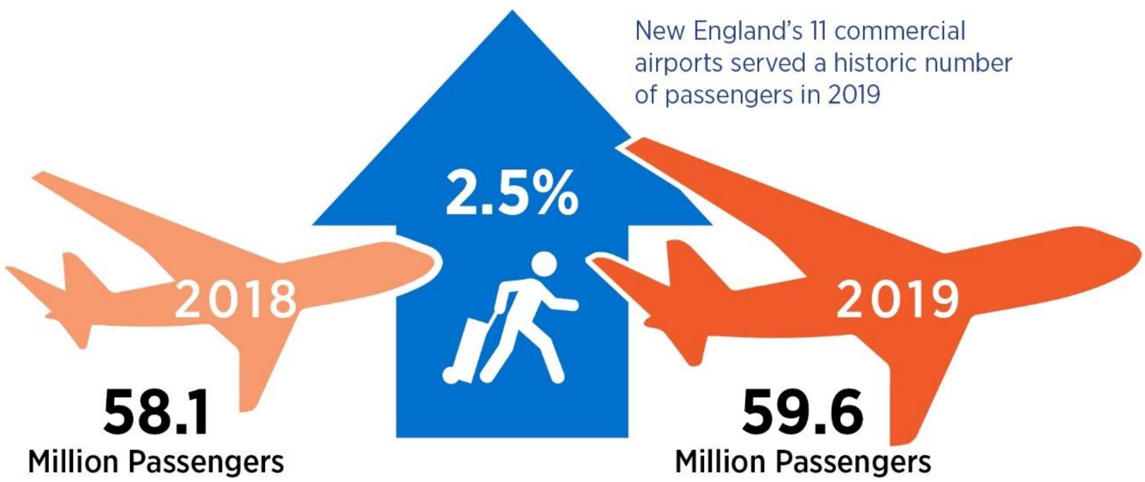
New England Regional Trends

Since 2000, as overall national and regional passenger activity levels have increased, aircraft operation activity levels have declined substantially due to trends of larger aircraft size, higher aircraft load factors, and reduced service in less profitable markets. The total number of aircraft operations at regional airports declined from 1.6 million in 2000 to approximately 1.0 million in 2018 and 2019.

Air Passenger Trends

Overall, passenger traffic at the New England airports grew at a higher rate than the overall U.S. air passenger market.[17] This New England passenger growth reflected increases at some New England regional airports and Logan Airport (**Figure 4-6**). Nationally, U.S. passenger traffic exceeded pre-2008/2009 recession levels in 2014, then continued to show growth and reached a new peak in 2019.

Figure 4-6 Passenger Activity at Logan Airport and Regional Airports in 2018 and 2019

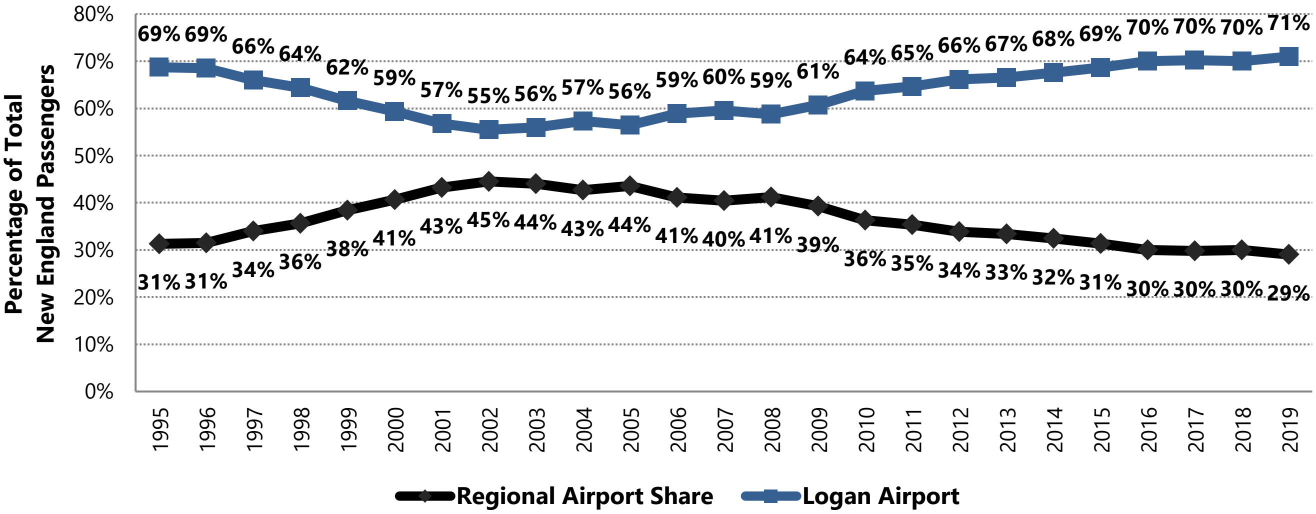


Source: VHB; Massport and individual airport data reports.

Logan Airport continued to drive regional air passenger traffic growth. In 2018 and 2019, Logan Airport saw year-to-year passenger growth of 6.6 and 3.9 and percent respectively, while total passenger traffic at other New England airports increased in 2018 by 5.3 percent, however declined in 2019 by 0.8 percent. The 10 regional airports accounted for a total of 17.2 million passengers in 2018 and 17.0 million passengers in 2019, compared to 16.3 million passengers in 2017. The 10 regional airports' share of total New England passengers decreased slightly to 29.7 percent in 2018 and 28.7 percent in 2019, compared to 29.8 percent in 2017 (see **Table 4-2** and **Figure 4-7**). The decline in passenger share at the regional airports in recent years reflects the growth of non-stop services by low-cost carriers, Delta Air Lines and jetBlue Airways' hub strategy focus at Logan Airport, and the reduction in industry-wide capacity from secondary and tertiary airports. Between 2000 and 2011, passenger traffic at secondary airports declined at an average annual rate of 1.7 percent and increased at a slower rate of 1.0 percent between 2011 and 2019. The regional airport passenger share decreased from 41.1 percent in 2006 to 29.0 percent in 2019 as low-fare options became available at Logan Airport and regional airports offered more limited services.

17 U.S. Department of Transportation. 2017. Bureau of Transportation Statistics for Total U.S. Scheduled Passenger Traffic.

Figure 4-7 Logan Airport's and Regional Airports' Share of New England Passengers, 1995-2019



Source: Massport and individual airport data reports.

Apart from Hanscom Field and Worcester Regional Airport, the regional airports closest to Logan Airport are T.F. Green Airport in Warwick, Rhode Island and Manchester-Boston Regional Airport in Manchester, New Hampshire. Because of their proximity to Logan Airport and overlapping market areas, these airports may be convenient choices for some passengers in the Greater Boston Area.

Logan Airport is well-positioned in terms of access, competitive airfares, and available air services to meet the demands of the core Boston air passenger market. Passenger traffic at T.F. Green Airport and Manchester-Boston Regional Airport peaked in 2005. After the 2005 peak, there was an industry-wide trend of airline service reductions at smaller airports. The number of passengers at T.F. Green Airport increased in 2018, but declined slightly in 2019, while the number of passengers at Manchester-Boston Regional Airport decreased in both 2018 and 2019. T.F. Green Airport and Manchester-Boston Regional Airport, however, remain well situated to serve their own catchment areas.

In 2019, the two airports served 11.8 percent (5.7 million) of the combined passengers at the three main commercial airports serving the Greater Boston area, down from 13.3 percent (5.9 million) in 2017 and a high share of 27.9 percent (8.8 million) in 2002. **Figure 4-8** depicts the historical distribution of air passengers using Logan Airport, T.F. Green Airport, and Manchester-Boston Regional Airport.

Table 4-2 Passenger Activity at New England Regional Airports and Logan Airport, 2000, 2010, 2015-2019

	Passenger Levels (millions)[1]							Percent Change	
Airport	**2000**	**2010**	**2015[2]**	**2016[2]**	**2017[2]**	**2018[2]**	**2019[2]**	**(2017-2018)**	**(2018-2019)**
Bradley International, CT	7.34	5.34	5.93	6.06	6.44	6.67	6.75	3.6%	1.2%
T.F. Green, RI	5.43	3.94	3.57	3.65	3.94	4.30	3.99	9.1%	(7.2%)
Manchester-Boston Regional, NH	3.17	2.81	2.08	2.02	1.97	1.85	1.70	(6.2%)	(7.9%)
Portland International Jetport, NH	1.34	1.71	1.73	1.79	1.86	2.13	2.18	14.8%	2.1%
Burlington International, VT	0.90	1.30	1.19	1.21	1.18	1.32	1.37	11.6%	4.1%
Bangor International, ME	0.38	0.39	0.54	0.55	0.53	0.61	0.61	10.3%	0.2%
Worcester Regional, MA	0.11	0.07	0.12	0.12	0.11	0.15	0.19	31.8%	34.2%
Portsmouth International, NH	0.07	0.00[3]	0.09	0.13	0.19	0.09	0.12	(53.3%)	39.7%
Tweed-New Haven Regional, CT	0.08	0.07	0.07	0.06	0.06	0.08	0.10	35.9%	22.7%
Hanscom Field, MA[4]	0.16	0.00[3]	0.00[3]	0.00[3]	0.01	0.01	0.02	5.7%	33.0%
Regional Subtotal	**18.98**	**15.63**	**15.30**	**15.58**	**16.29**	**17.17**	**17.03**	**5.3%**	**(0.8%)**
Logan Airport	**27.73**	**27.43**	**33.45**	**36.29**	**38.41**	**40.94**	**42.52**	**6.6%**	**3.9%**
Total	**46.71**	**43.06**	**48.75**	**51.87**	**54.70**	**58.11**	**59.56**	**6.2%**	**2.5%**

Source: Massport and individual airport data reports. Non-Massport airports may be based on U.S. Department of Transportation, T-100 Database for scheduled and non-scheduled services, if direct airport records were unavailable.

Notes: Data for Logan Airport includes domestic, international, and general aviation passengers.
Numbers in parentheses ( ) indicate negative numbers.

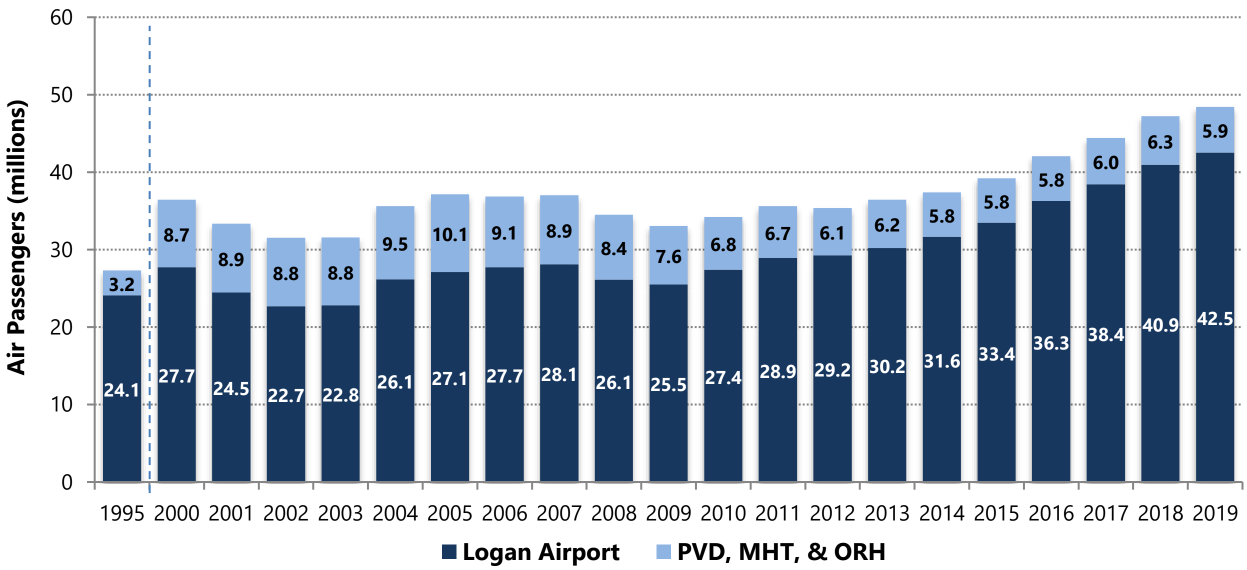
1 All passengers in millions. Passenger levels are enplaned plus deplaned passengers (where available) or FAA enplaned passengers times two.

2 Reflects most updated passenger statistics for Burlington International, Bangor International, and Portsmouth International airports based on latest available airport records as of December 2019.

3 Indicates fewer than 7,000, but more than zero scheduled commercial passengers.

4 Hanscom Field also reported annual non-scheduled passenger enplanements above 10,000 between 2011 and 2019 via U.S. DOT T-100.

Figure 4-8 Passenger Activity Levels at Logan Airport (BOS), T.F. Green (PVD), Manchester-Boston Regional (MHT), and Worcester Regional (ORH) Airports, 1995, 2000-2019



Source: Massport and individual airport data reports.

Aircraft Operation Trends

As shown in **Table 4-3**, total aircraft operations in the New England region (including Logan Airport) saw increases in 2018 (1,024,743 operations) and 2019 (1,036,707 operations) compared to 1,015,203 operations in 2017. An increase in aircraft operations at Logan Airport was accompanied by an overall decrease in aircraft operations at the 10 regional airports. Total aircraft operations at Logan Airport increased by 22,653 operations between 2017 and 2018 and by 3,152 between 2018 and 2019, while total operations at the regional airports decreased from 613,832 operations in 2017 to 609,531 operations in 2019.

Commercial operations in the New England region increased from 2017 to 2019 due to airlines gradually increasing capacity and services in more profitable markets, such as the Boston Metropolitan Area. These trends are seen across the industry. Combined GA operations in the New England region decreased in 2018 (309,595) compared to 2017 (326,679) but showed some recovery in 2019 (325,455 operations) compared to the prior year. The decrease in 2018 can be partially attributed to the increase in crude oil prices in 2017, which resulted in increased fuel prices. Fuel costs usually account for a significant portion of GA aircraft operating costs compared to commercial airlines, and therefore suggest an overall increased cost to GA flying. GA operations continue to be the dominant type of aircraft activity at the regional airports. GA represented 7.0 percent of aircraft activity at Logan Airport in 2018 and 2019, which primarily accommodates the region's domestic and international commercial airline operations.

Overall, the regional airports accommodated a much greater share of the region's aircraft operations than their share of air passengers due to high levels of GA traffic. In 2019, the regional airports accounted for 28.6 percent of the region's passenger traffic, but 58.8 percent of aircraft activity. On average, there were approximately 28.8 passengers per aircraft operation at the regional airports in 2018, which declined to 28.2 in

2019, compared to 96.6 (in 2018) and 99.5 (in 2019) passengers per operation at Logan Airport in their respective years, largely reflecting aircraft sizes.

Total aircraft operations in the region in 2018 and 2019 were well below the region's level of aircraft operations in 2000. Total aircraft operations decreased, falling from approximately 1.6 million operations in 2000 to just over 1 million operations in 2019. There were similarly large reductions in all three categories of activity: commercial, GA, and military. Several factors have contributed to the declining trend in commercial airline operations, including a shift to larger capacity aircraft, higher passenger load factors onboard an aircraft, and a concurrent reduction in airline services at smaller regional airports given airline network strategies evolving. Factors negatively affecting GA activity include increased fuel prices through the past decade and a declining private pilot base. Military operations have also declined, consistent with nationwide trends.

Table 4-3 Aircraft Operations by Classification for New England's Airports, 2017, 2018, 2019

	2017				2018				2019			
Airport	**Commercial[1]**	**GA[2]**	**Military[2]**	**Total**	**Commercial[1]**	**GA[2]**	**Military[2]**	**Total**	**Commercial[1]**	**GA[2]**	**Military[2]**	**Total**
Bradley International	78,435	13,233	3,006	**94,674**	78,463	13,280	2,898	**94,641**	76,352	12,652	2,379	**91,383**
T.F. Green	45,831	26,274	490	**72,595**	49,425	21,124	399	**70,948**	46,393	23,017	351	**69,761**
Portland International Jetport	32,845	18,392	568	**51,805**	35,534	20,717	675	**56,926**	35,855	21,731	646	**58,232**
Manchester-Boston Regional	37,850	13,169	697	**51,716**	36,085	15,664	423	**52,172**	34,965	15,762	412	**51,139**
Burlington	26,684	34,386	5,080	**66,150**	28,611	38,078	3,547	**70,236**	28,413	40,894	3,963	**73,270**
Bangor[5]	15,874	17,223	10,005	**43,102**	17,241	16,670	9,758	**43,669**	17,678	17,117	10,805	**45,600**
Portsmouth International	9,597	31,555	8,150	**49,302**	8,709	30,424	7,600	**46,733**	9,346	28,742	3,457	**41,545**
Tweed-New Haven	6,820	18,389	574	**25,783**	6,038	18,220	536	**24,794**	6,094	21,853	483	**28,430**
Worcester Regional	2,925	26,332	850	**30,107**	3,710	14,473	753	**18,936**	4,441	15,621	701	**20,763**
Hanscom Field[3 4]	292	127,726	580	**128,598**	286	120,945	433	**121,664**	426	127,755	490	**128,671**
Subtotal	**257,153**	**326,679**	**30,000**	**613,832**	**264,102**	**309,595**	**27,022**	**600,719**	**259,963**	**325,144**	**23,687**	**608,794**
Logan Airport	370,251	31,120	0	**401,371**	393,084	30,940	0	**424,024**	398,254	28,922	0	**427,176**
Total	**627,404**	**357,799**	**30,000**	**1,015,203**	**657,186**	**340,535**	**27,022**	**1,024,743**	**658,217**	**354,066**	**23,687**	**1,035,970**
					Percent Change (2017-2018)				**Percent Change (2018-2019)**			
Airport					**Commercial[1]**	**GA[2]**	**Military[2]**	**Total**	**Commercial[1]**	**GA[2]**	**Military[2]**	**Total**
Bradley International					**0.0%**	**0.4%**	**(3.6%)**	**(0.0%)**	**(2.7%)**	**(4.7%)**	**(17.9%)**	**(3.4%)**
T.F. Green					**7.8%**	**(19.6%)**	**(18.6%)**	**(2.3%)**	**(6.1%)**	**9.0%**	**(12.0%)**	**(1.7%)**
Portland International Jetport					**8.2%**	**12.6%**	**18.8%**	**9.9%**	**0.9%**	**4.9%**	**(4.3%)**	**2.3%**
Manchester-Boston Regional					**(4.7%)**	**18.9%**	**(39.3%)**	**0.9%**	**(3.1%)**	**0.6%**	**(2.6%)**	**(2.0%)**
Burlington					**7.2%**	**10.7%**	**(30.2%)**	**6.2%**	**(0.7%)**	**7.4%**	**11.7%**	**4.3%**
Bangor					**8.6%**	**(3.2%)**	**(2.5%)**	**1.3%**	**2.5%**	**2.7%**	**10.7%**	**4.4%**
Portsmouth International					**(9.3%)**	**(3.6%)**	**(6.7%)**	**(5.2%)**	**7.3%**	**(5.5%)**	**(54.5%)**	**(11.1%)**
Tweed-New Haven					**(11.5%)**	**(0.9%)**	**(6.6%)**	**(3.8%)**	**0.9%**	**19.9%**	**(9.9%)**	**14.7%**
Worcester Regional					**26.8%**	**(45.0%)**	**(11.4%)**	**(37.1%)**	**19.7%**	**7.9%**	**(6.9%)**	**9.6%**
Hanscom Field					**(2.1%)**	**(5.3%)**	**(25.3%)**	**(5.4%)**	**49.0%**	**5.6%**	**13.2%**	**5.8%**
Subtotal					**2.7%**	**(5.2%)**	**(9.9%)**	**(2.1%)**	**(1.6%)**	**5.0%**	**(12.3%)**	**1.3%**
Logan Airport					**6.2%**	**(0.6%)**	**0.0%**	**5.6%**	**1.3%**	**(6.5%)**	**0.0%**	**0.7%**
Total					**4.7%**	**(4.8%)**	**(9.9%)**	**0.9%**	**0.2%**	**4.0%**	**(12.3%)**	**1.1%**

Sources: Federal Aviation Administration (FAA) tower counts; Massport and individual airport data reports.

Notes: Ranked by commercial operations. FAA tower counts used for all airports except Logan Airport and Portsmouth International.
Numbers in parentheses ( ) indicate negative numbers. GA – General Aviation

1 May include some Air Taxi operations by fractional jet operators. FAA tower counts combine some fractional jet operations with small regional/commuter airline operations.
2 Includes itinerant and local operations at the regional airports. Military operations at Logan Airport are negligible and not included in Massport counts.
3 Value represents non-scheduled commercial activity.
4 Values sourced from *2017 L. G. Hanscom Field Environmental Status & Planning Report reflect updated* CY 2017 based on FAA tower counts since the publication of the 2017 ESPR report.
5 Reflects updated CY 2017 aircraft operation statistics based on updated FAA tower counts since the publication of the *2017 ESPR* report.

Airline Passenger Service in 2018 and 2019

Airlines can adjust service at an airport or on a specific route in two ways: by increasing or decreasing the number of flights operated and/or changing the size of the aircraft flown on the route. Changes in flight frequency and in aircraft size affect the number of seats available to passengers, also known as seat capacity. Airline services are therefore discussed in terms of seat capacity as well as the number of flight departures.[18] This section examines changes in airline departures and seat capacity and provides an overview of new and discontinued routes at the regional airports in 2018 and 2019.

Service Developments at the Regional Airports

In 2018, a total of 16 airlines and in 2019, a total of 16 airlines provided scheduled passenger service from the 10 regional airports.[19] Bangor, Burlington, Tweed-New Haven, Worcester Regional, and Portsmouth International airports saw an increase in scheduled commercial services between 2018 and 2019, while some of the other airports experienced service declines. The steep airline service cuts seen after 2007 due to the 2008/2009 economic recession and high fuel prices had largely come to an end, however, airlines continued to be conservative in growing capacity, resulting in reduced frequencies on less profitable routes or introducing larger aircraft with greater seat counts onboard (i.e. "upgauging" aircraft size) for particular routes. Much of this recent growth was lost in early 2020.

Worcester Regional Airport (ORH)

Worcester Regional Airport is located in Worcester and Leicester (central Massachusetts), approximately 50 miles west of Logan Airport. Worcester Regional Airport is an important aviation resource that accommodates both corporate GA activity and limited commercial airline services. Massport assumed operation of Worcester Regional Airport in 2000 and later acquired the airport from the City of Worcester in June 2010.

18 A departure is an aircraft take-off at an airport. While aircraft operations include both departures and arrivals, airline services are typically described in terms of departures, as the number of scheduled departures generally equals the number of scheduled arrivals. Changes in departures translate to changes in overall operations.

19 Includes Allegiant Air, which served Bangor International Airport (Orlando/Sanford and St. Petersburg/Clearwater service), T.F. Green Airport (Cincinnati, Punta Gorda, and Savannah service), and Portsmouth International Airport (Savannah, Myrtle Beach, Punta Gorda, and Orlando/Sanford service).

jetBlue E-190 aircraft at Worcester Regional Airport. Source: Massport.

Massport continues to invest in Worcester Regional Airport by modernizing the airport to better serve the commercial airline travel demands of the central Massachusetts region. Together with the City of Worcester and the Federal Aviation Administration (FAA), Massport initiated a 10-year, $100 million investment to revitalize and attract commercial operations to Worcester Regional Airport. Massport, in conjunction with the City of Worcester and other community stakeholders, actively promoted the reintroduction of scheduled airline service at Worcester Regional Airport and successfully secured new service provided by jetBlue Airways, including non-stop service to Orlando International and Fort Lauderdale-Hollywood airports. This service has proven to be popular, with jetBlue Airways achieving consistently high load factors (over 78 percent between 2017-2019[20]) and handling 132,800 passengers in 2018 and 150,200 passengers in 2019 representing a year-over-year growth of over 13 percent. In November 2019, Worcester celebrated its 750,000th passenger since the return of commercial service.

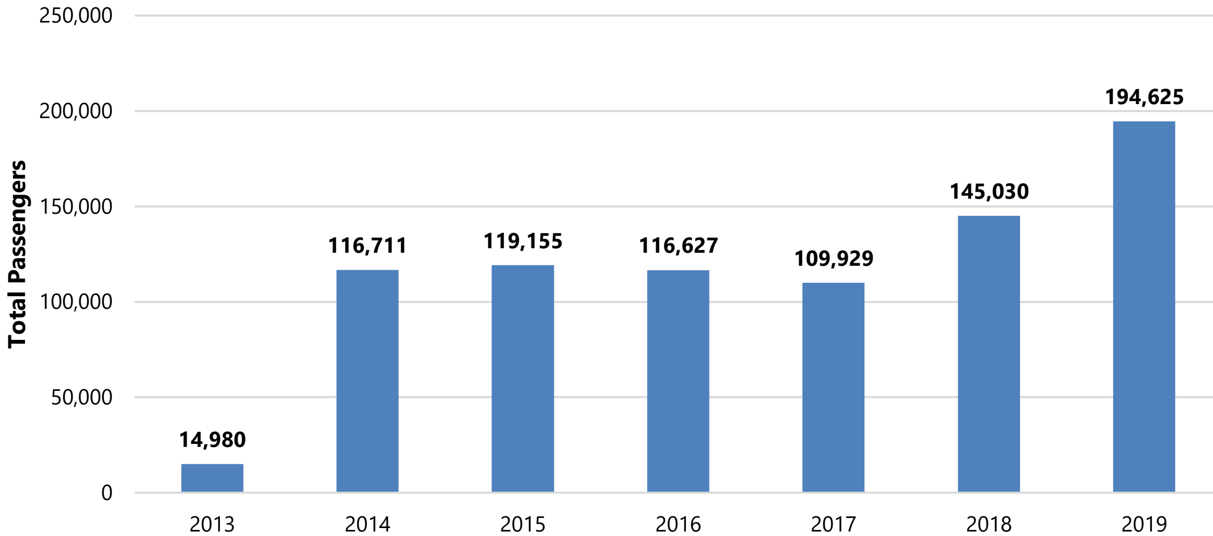
Passenger and Operation Trends

Worcester Regional Airport has experienced consecutive commercial passenger growth at an average rate of 30 percent per year since 2013, serving a cumulative total of 817,057 commercial air passengers (**Figure 4-9**). From 2017 to 2018 alone, Worcester Regional Airport saw passenger numbers increase by approximately 34 percent. Although commercial air passenger numbers have increased, GA operations and passengers have decreased. Aircraft operations declined in 2018 but recovered somewhat in 2019 (**Table 4-2** and **Table 4-3**), totaling 18,936 in 2018 and 20,763 in 2019, with GA accounting for nearly 75 percent of aircraft activity. The combined commercial and military[21] aircraft operations increased from 2017 by 18 percent in 2018, then another 15 percent in 2019 given Worcester gained new air service during the two-year period, while overall GA operations decreased (**Table 4-3)**.

20 jetBlue Airways services at Worcester Regional Airport had an average load factor of 84 percent in 2015, 81 percent in 2016, and 78 percent in 2017-2019 (U.S. Department of Transportation, T-100 Database).

21 Includes itinerant and local operations. "Itinerant" represents operations that arrive from outside the traffic pattern or depart from the airport traffic pattern. "Local" represents operations that stay within the traffic pattern airspace (non-itinerant). Definitions from FAA.

Figure 4-9 Passenger Activity at Worcester Regional Airport, 2013–2019



Source: Massport.

Service Developments

In 2019, Worcester Regional Airport was served by jetBlue Airways, American Airlines, and Delta Air Lines. jetBlue offered non-stop service to Fort Lauderdale and Orlando. Prior to the entry of jetBlue Airways in 2013, Worcester Regional Airport was served only by Direct Air, which operated regularly scheduled charter services from 2008 to 2012. When Direct Air filed for Chapter 7 bankruptcy in April 2012, Worcester Regional Airport no longer provided commercial service. After Direct Air ceased operations, Worcester Regional Airport returned to commercial service, initially with two daily scheduled departures operated by jetBlue Airways. In 2018, Worcester Regional Airport saw an average of three daily departures with the inclusion of American Airlines service (detailed below). According to OAG schedule data for August 2019, the Airport averaged five daily departures.

Massport, in conjunction with the City of Worcester and other community stakeholders, actively promoted the reintroduction of scheduled airline service at Worcester Regional Airport and successfully secured new service provided by jetBlue Airways. In November 2013, jetBlue Airways commenced non-stop services to Orlando International and Fort Lauderdale-Hollywood airports using 100-seat Embraer 190 aircraft. In 2017, jetBlue Airways maintained daily service on 100-seat Embraer 190 aircraft to Fort Lauderdale and Orlando, with no change in operations from 2016. In February 2017, jetBlue Airways announced daily service to New York JFK, which commenced in May 2018 following the completion of the CAT III Instrument Landing System (see below). American Airlines began offering flights to Philadelphia International Airport in October 2018 and Delta Air Lines initiated flights to Detroit Metropolitan Airport beginning in August 2019.

As of October 2020, in response to COVID-19, all three airlines have temporarily suspended service in and out of the Worcester Regional Airport.

Facility Improvements

As mentioned above, Massport, in collaboration with the City of Worcester and with the use of federal grants, has already initiated a 10-year, $100 million investment to revitalize and grow commercial operations at Worcester Regional Airport. Massport is committed to the long-term support of Worcester Regional Airport as demonstrated by the following initiatives:

- Massport completed construction of Worcester Regional Airport's CAT III Instrument Landing System in 2018, which has significantly improved operational conditions and enhanced safety to a level equal to that of all other commercial airports in New England. These improvements allow aircraft to land on Runway 11 during virtually all weather conditions. The CAT III system became fully operational after FAA certification in March 2018.
  - This project significantly improves Worcester Regional Airport's all-weather reliability, a long-standing impediment to greater utilization of this airport. The announced addition of new service to New York and two major airline hubs in the next several years reflects the impact of this investment.
  - This project included upgrading the Runway 11 Instrument Landing System from a CAT I to a CAT III system, and its associated required infrastructure and navigation aids, along with a partial parallel taxiway.

CAT III Instrument Landing System.
Source: Massport.

- Massport received a federal grant for two jet passenger boarding bridges through the FAA's Airport Improvement Program. The jet bridges will include ground power and preconditioned air for gates 3 and 4 in the commercial terminal building, which add environmental benefits by protecting air quality and conserving fuel.
- In January 2012, Massport approved a proposal by Rectrix Commercial Aviation Services, Inc. (Rectrix)—which was recently acquired by Ross Aviation[22] in February 2019—to develop an aircraft hangar and office space at Worcester Regional Airport. The project included 27,000 square feet of hangar and office space that house large corporate jets and a regional aircraft maintenance facility. Ross Aviation offers private jet charters and fixed base operator (FBO) services, including transient aircraft parking and fueling services, from the new facility. Construction (started by Rectrix entity) was completed in November 2015. A replacement fuel storage center ("fuel farm") commenced in 2019 and became operational in 2020. Located near the hangars, the new fuel farm makes the availability of fuel for airlines and private jets more reliable.
- In 2020, planning for Phase II of the Ross Rectrix Aviation redevelopment proceeded with the focus on siting of replacement hangars.

22 Ross Aviation already has fixed-base operations at airports in Alaska, California, Arizona, New York, and the Cayman Islands. Ross-Rectrix Aviation is now the fixed-base operator at Worcester Regional Airport, Hanscom Field, Westfield-Barnes, and Barnstable Municipal Airports in Massachusetts.

Hanscom Field (BED)

Located in Bedford, Massachusetts, approximately 20 miles northwest of Logan Airport, Hanscom Field is New England's premier facility for business/corporate aviation. Hanscom Field is a full-service GA airport that serves a critical role as a GA reliever airport for Logan Airport by accommodating a wide variety of GA activities, including corporate aviation, private flying, commuter air services, as well as charters and light cargo.

Hanscom Field accommodated 120,945 GA operations in 2018 and 127,755 operations in 2019 which is approximately four times the number of GA operations that occurred at Logan Airport. Consistent with Hanscom Field's role as a premier corporate airport, new and replacement hangars are being built to accommodate the need for corporate jet services. In addition to its role as a GA facility, in the past, Hanscom Field has also accommodated niche scheduled commercial airline services.

Passenger and Operation Trends

Passenger activity[23] at Hanscom Field is currently limited to non-scheduled passenger service, primarily because of charter flight operations. Total passenger activity has remained relatively consistent since 2013 (**Table 4-2**). Overall, aircraft operations decreased from 128,598 in 2017 to 121,664 in 2018 but increased to 128,671 in 2019. From 2005 to 2019, aircraft operations at Hanscom Field decreased by approximately 25 percent.

Facility Improvements

Massport continues to invest in Hanscom Field to improve and upgrade facilities and maintain a safe, secure, and efficient airport. Past and future capital investments ensure that Hanscom Field can continue to serve its role as a GA reliever to Logan Airport as well as a premier business aviation facility for the region. In FY 2018, Massport invested $13.4 million in airfield, terminal, equipment, and other facility improvements at Hanscom Field. These airport improvement projects are summarized in the annual reports on *The State of Hanscom*.[24]

Massport's recently completed and ongoing capital investment projects at Hanscom Field include:

- Rehabilitation of Runway 11/29 and Runway 23 safety area, beyond the runway end, and a portion of Taxiway Juliet, south of Taxiway Tango;
- Ongoing removal of vegetation obstructions on all four runway ends using recommendations in the 2014 to 2018 and 2019 to 2023 *Vegetation Management Plan* updates;
- Construction of a new Airport Rescue and Firefighting Facility (ARFF) and U.S. Customs and Border Protection (CBP) permanent facility, which opened in May 2019;
- Initiation of Massport Fire-Rescue operations in November 2015;
- Continued implementation of all aspects of Massport's *Wildlife Hazard Management Plan* for BED;
- Replacement of the field maintenance garage roof, which had reached the end of its useful life;

23 Passenger activity reports on "non-scheduled" passenger enplanements. There was no "scheduled" service or passenger activity at Hanscom Field.

24 Massport. March 2019. *The State of Hanscom*. http://www. http://www.massport.com/media/3115/state-of-hanscom-2018.pdf.

- An Airfield Geometry Study; and
- A new Boston MedFlight Leadership in Energy and Environmental Design (LEED®) certified hangar.

Upcoming projects at Hanscom Field include:

- Periodic replacement of T-Hangars in the terminal area;
- Improvements to airfield drainage;
- A replacement salt shed; and
- Updates to aging infrastructure, including new corporate hangars, and plans for replacement of hangars in the Pine Hill area and North Airfield.

In addition to Massport's investments, the Authority solicits third-party development of facilities that support and enhance Hanscom Field's role in the regional transportation system. Many of the hangars at Hanscom Field are owned or leased by tenants who are responsible for maintaining them. Ongoing third-party projects at Hanscom Field are listed below.

- In 2017, Massport continued working with General Services Administration (GSA) to acquire a parcel of land north of the airfield, which was at that time owned by the U.S. Navy. In April 2018, Massport declined the transfer of the Navy property and the land was sold to Runway Reality Ventures, LLC for $9 million in a GSA auction. Planning for redevelopment of that facility is underway.
- Massport issued a Request for Proposals (RFP) in February of 2018 for redevelopment of a site immediately west of the Navy Hangar. An Environmental Assessment (EA) for development of the property was filed for up to 110,000 square feet of corporate hangar development at this location.
- In March 2019, Massport issued an RFP for design services associated with replacement of the Pine Hill T-Hangars to a 7-acre site west of the Navy Hangar. As planned, the development will construct replacement T-Hangars and supporting taxilane with construction starting in the spring of 2021 and lasting approximately 18 months.

Bradley International Airport (BDL)

In 2011, the Connecticut Airport Authority (CAA) was established to oversee the operation and development of Bradley International Airport. The CAA, a quasi-public agency consisting of an 11-member board, manages day-to-day operations at Bradley International Airport, as well as at five GA airports in Connecticut (Danielson, Groton/New London, Hartford Brainard, Waterbury-Oxford, and Windham airports). The goal of the CAA is to transform Bradley International Airport and the five GA airports into economic drivers for the state. Bradley International Airport was previously run by a board under the Connecticut Department of Transportation (ConnDOT).

Passenger and Operation Trends

Passenger activity at Bradley International Airport increased by 1.2 percent from 2018 to 2019. This growth marked the eighth straight year of passenger traffic growth since 2012. In 2018, Bradley handled 6.67 million passengers and that grew to 6.75 million passengers in 2019. This recent peak remains below the historic peak of 7.34 million passengers in 2000 (**Table 4-2**). Aircraft operations at Bradley International Airport decreased from 94,674 in 2017 to 91,383 in 2019, however the number of passengers flown per operation at the airport

grew from 68 in 2017 to 74 in 2019, attributed by new ULCC service on relatively larger single-aisle aircraft (i.e. Frontier's A320) and enhancing passenger connectivity via legacy carrier hub cities like Detroit/Atlanta (Delta Air Lines), Charlotte/Chicago (American Airlines), and Chicago/Washington Dulles (United Airlines) on larger jet engine aircraft with fewer frequencies (**Appendix Table F-3**). From 2000 to 2019, aircraft operations decreased by approximately 46 percent.

Facility Improvements

The ongoing capital improvement program includes the following projects:

- A consolidated rental car facility;
- Ground Transportation Center (July 2019 groundbreaking);
- Demolition of the Murphy Terminal;
- Roadway demolition and re-alignment;
- Utility relocation; and
- Airfield improvements.

In March 2019, the airport published a $1.4-billion master plan that proposed a range of near-term (2017-2022), mid-term (2023-2027) and long-term (2028-2037) projects, which includes the following initiatives:

- New passenger Terminal B building;
- Reconfiguration of Schoephoester Road;
- Taxiway enhancement;
- New Baggage inspection/federal inspection service facility; and
- Additional parking.

T.F. Green Airport (PVD)

T.F. Green Airport, located in Warwick, Rhode Island, is the first state-owned and operated airport in the U.S. T.F. Green Airport is owned by the Rhode Island Airport Corporation (RIAC).

Passenger and Operation Trends

Passenger activity at T.F. Green Airport increased by 9.1 percent from 2017 to 2018 and declined by 7.2 percent from 2018 to 2019. Aircraft operations declined from 72,595 in 2017 to 70,948 in 2018 and 69,761 in 2019 (**Table 4-3**); commercial, GA, and military operations all saw reductions. The main driver behind decline in passenger data in 2019 was due to Frontier reducing its capacity footprint at T.F. Green by nearly 48 percent compared to its previous year's seat capacity, and route reductions and suspensions by Southwest Airlines and Norwegian Air. Nonetheless, T.F. Green Airport remains well situated to serve its own catchment area.

Facility Improvements/Master Plan Update

In April 2019, RIAC announced a $1.3-million update of the T.F. Green Master Plan to focus on defining plans to accommodate forecasted demand over a 20-year period. Initial workshops were held in June 2019. The long-range forecast is evaluating passenger growth from 1.9 million annual passengers to 3.7 million annual passengers and growth in annual aircraft operations from 72,000 to 89,000.

Manchester-Boston Regional Airport (MHT)

Manchester-Boston Regional Airport is in Manchester, New Hampshire, less than 50 miles north of Boston, Massachusetts. The airport is owned by the City of Manchester with airport management consisting of a five-member board. By 2005, over 4 million passengers were using Manchester-Boston Regional Airport. However, the passenger level has been declining for the past few years. In 2018, MHT served approximately 1.85 million passengers, and approximately 1.70 million passengers were served in 2019.

Passenger and Operation Trends

Passenger activity at Manchester-Boston Regional Airport continues to decrease annually as it has over the last decade, by 6.2 and 7.9 percent in 2018 and 2019 (**Table 4-2**). Overall, aircraft operations rose slightly by 0.9 percent, from 51,716 in 2017 to 52,172 in 2018 and fell by 2.0 percent in 2019 to 51,139. Although commercial and military operations decreased annually in 2018 and 2019, GA activity continued to increase (**Table 4-3).** From 2000 to 2019, aircraft operations at Manchester-Boston Regional Airport decreased by 52.6 percent.

Facility Improvements

Manchester-Boston Regional Airport completed its most recent Airport Master Plan Update in 2011. The Airport Master Plan Update provides a blueprint for development and improvement of airport facilities and infrastructure through 2030. Recent and ongoing improvement projects at the airport include:

- The Terminal Ramp Replacement Project, to rehabilitate the concrete apron areas adjacent to the terminal building, began in 2012 and was completed in 2013.
- Demolition of structures in the runway protection zone (RPZ)[25] of Runway 06 to remove buildings with usages deemed non-compatible with RPZs, as defined by the FAA. Elements of the project include demolishing the Highlander Inn and Conference Center and associated buildings.
- Upgrades to the terminal building heating, ventilation, and air conditioning (HVAC) systems to address certain deficiencies in the terminal cooling system and provide significant improvements to customer comfort levels within areas of the terminal building.
- Parking Lot A access improvements.
- Overlay of a portion of Taxiway M.

25 A runway protection zone (RPZ) enhances the safety of the area beyond the end of the runway in the event of a landing or crash beyond the runway end. Only compatible land uses are permitted within an RPZ. Land uses prohibited from an RPZ include residences and places of public assembly.

- Reconstruction of Taxiway H pavement of approximately 1,200 feet.
- Relocation of Taxiway B stub to meet design standards.

Other potential projects over the coming years include: wireless network and support services; a rental car customer service facility; security checkpoint consolidation; operations and maintenance of the in-line baggage handling system, and a passenger boarding bridge.

Portland International Jetport (PWM)

Portland International Jetport, located in Portland, Maine, is owned by the City of Portland. Passenger activity and operations increased each year between 2014 and 2019. Portland International Airport also experienced an increase in seat capacity from jetBlue Airways, United Airlines, Southwest Airlines, and Delta Air Lines.

In 2018, PWM published its Sustainable Master Plan. This master plan update was developed to "evaluate the airport's capabilities and role, to review forecasts of future aviation demand, and to plan for the timely improvement of facilities that may best meet that demand and maintain compatibility with the environs." The airport master plan is intended to "provide guidelines for the airport's overall development, maintenance, and operation for the next 20 years." In addition to new environmental goals, the Plan outlines a program of airside and landside improvements, including new passenger gates, expansion of parking, enhanced aircraft parking and de-icing facilities, cargo and GA improvements.

Passenger and Operation Trends

Passenger activity at Portland International Jetport continued to grow in 2018, with both years exceeding 2 million passengers. In 2018 and 2019, PWM served 2.1 million and 2.2 million passengers, respectively. Overall, aircraft operations increased from 51,805 operations in 2017 to 56,926 operations in 2018 and 58,232 in 2019. From 2001 (recent peak in operations) to 2019 operations at Portland International Jetport decreased by just over 48 percent.

Burlington International Airport (BTV)

Burlington International Airport, located in Burlington, Vermont, is owned by the City of Burlington. It is a joint-use civil-military airport. When comparing 2019 performance versus 2017, Burlington International Airport experienced an overall increase in passenger traffic, operations, and available seat capacity. In August 2020, the airport celebrated its 100th anniversary.

Burlington International Airport began the process of updating its Airport Master Plan, previously approved in 2012. The 2018 Master Plan update will provide an inventory of current facilities, present forecasts of growth, assess the need for additional development or rehabilitation of facilities, consider alternatives for future improvements, and provide a capital improvement plan.

Passenger and Operation Trends

Passenger activity at Burlington International Airport increased by 11.6 percent from 2017 to 2018, and 4.1 percent the year after. Overall, aircraft operations increased by 6.2 percent, from 66,150 operations in 2017 to 70,236 operations in 2018. The following year, total operations increased 4.3 percent to 73,270, led by

greater activity in GA and military **(Table 4-3)**. From 2000 to 2019, aircraft operations at Burlington International Airport decreased by 36.5 percent.

Bangor International Airport (BGR)

Bangor International Airport is located in Bangor, Maine and is owned by the City of Bangor. Bangor International Airport's overall passenger activity and operations increased in 2018 and 2019. Bangor International Airport also saw its seat capacity increase in 2018 by 10.9 percent, but then decline by 4.3 percent in 2019.

Passenger and Operation Trends

Passenger activity at Bangor International Airport increased by 10.3 percent from 2017 to 2018 and increased again by a margin of 0.2 percent from 2018 to 2019. Overall, aircraft operations increased from 43,016 operations in 2017 to 43,699 operation in 2018 and 45,600 operations in 2019. Bangor saw a net gain in both commercial and military operations between 2017 and 2019, however GA remained flat (**Table 4-3**). From 2000 to 2019, aircraft operations at Bangor International Airport decreased by approximately 45 percent.

Tweed-New Haven Airport (HVN)

Tweed-New Haven Airport, located in New Haven, Connecticut, is managed by a six-member board and is operated by the Tweed-New Haven Airport Authority. In 2018, passenger activity increased 35.9 percent while operations decreased 3.8 percent over 2017 performance. Passenger levels continued to rise by another 22.7 percent in 2019, along with total frequencies, which grew 14.7 percent. In 2019, Tweed-New Haven Airport saw a significant 31.0 percent increase in departing American Airlines seat capacity versus 2018 due to the carrier upgauging its 50-seat aircraft to 76-seat regional jets that operate to Philadelphia. American Eagle also introduced less than daily non-stop service to Charlotte in the beginning of 2019. Southern Airways Express also commenced summer seasonal service to Nantucket that began in June 2019.

Passenger and Operation Trends

Passenger activity at Tweed-New Haven Airport increased in both 2018 and 2019 compared to the previous year (**Table 4-2**). Overall, aircraft operations decreased from 25,783 operations in 2017 to 24,794 in 2018 but recovered to 28,430 in 2019 (**Table 4-3**). From 2000 to 2019, aircraft operations at Tweed-New Haven Airport decreased by approximately 54 percent.

Portsmouth International Airport (PSM)

Portsmouth International Airport, located in Portsmouth, New Hampshire, is operated by the Pease Development Authority. There have been $85 million in airfield infrastructure improvements in the past 15 years and a newly reconstructed 5.3-acre terminal apron.

Passenger and Operation Trends

Passenger activity at Portsmouth International Airport increased in 2018 to 2019 (**Table 4-2**). Overall, aircraft operations decreased from 49,302 operations in 2017 to 46,733 operation in 2018 and 41,545 operations in

2019. (**Table 4-3**). From 2000 to 2019, aircraft operations at Portsmouth International Airport has declined by 12.9 percent.

Local and Regional Long-Range Transportation Planning

A balanced regional intermodal transportation network reduces reliance on Logan Airport as the region's primary transportation hub and provides New England travelers with a greater range of viable transportation options. This section highlights efforts to promote an integrated, multimodal regional transportation network through cooperative transportation planning among transportation agencies and concerned parties.

Massport plays a fundamental role within the transportation systems of the Boston metropolitan area and New England and supports an integrated multimodal transportation policy to improve the efficient use of transportation infrastructure on both a metropolitan and a regional scale. Logan Airport functions as New England's premier commercial airport, providing an essential connection between the New England states and the global economy. Recent studies have indicated that there is a significant lack of usable aviation capacity in the coastal mega-regions[26] (although not in Boston itself) and identified a need for access to alternative forms of short-distance travel across these regions.[27]

Because the construction of a second major Boston airport has been deemed impractical, high-speed rail is increasingly viewed as a potential complement in the regional transportation system and aviation planning.[28] Given the comparable travel times, proximity of service to downtown Boston, and the potential for highly efficient electrified propulsion, high-speed rail could provide intercity connectivity for city-pairs in a corridor up to 600 miles long that would be competitive with air travel.[29] Boston's South Station is undergoing planning and design for expansion that would support current and future rail mobility in Massachusetts and along the Northeast Corridor (NEC), including future high-speed rail.

Boston and Statewide Long-Term Transportation Vision

The following sections describe long-term transportation initiatives that are part of the Boston and statewide transportation vision. Where applicable, these sections highlight Massport's commitment to and involvement in the regional transportation system.

Long-Range Transportation Plan of the Boston Region Metropolitan Planning Organization (MPO)

In July 2015, the Boston MPO published its quadrennial long-range plan for the region and its transportation network, titled *Charting Progress to 2040*.[30] The Boston MPO is updating its Long-Range Transportation Plan, *Destination 2040*, adopted in 2019. The plan focuses on six goals: safety; preservation of the existing system;

26 The coastal mega-regions are the continuously urbanized areas along the east and west coasts of the U.S. (Washington, DC, Philadelphia, New York City, Hartford, and Boston).

27 Federal Aviation Administration. 2007. *Capacity Needs in the National Airspace System 2007-2025* (commonly referred to as FACT-2). https://www.faa.gov/airports/resources/publications/reports/media/fact_2.pdf; Transportation Research Board. 2010. *ACRP Report 31: Innovative Approaches to Addressing Aviation Capacity Issues in Coastal Mega-regions.* http://rsginc.com/files/publications/24.RSG_ACRP_Report31.pdf.

28 Transportation Research Board. 2015. *ACRP 03-23: Integrating Aviation and Passenger Rail Planning*. https://crp.trb.org/acrp0715/acrp-report-118-integrating-aviation-and-passenger-rail-planning/.

29 America 2050. 2009. *Where High-Speed Rail Works Best.* http://www.america2050.org/pdf/Where-HSR-Works-Best.pdf.

30 Boston Region Metropolitan Planning Organization. *Charting Progress to 2040*. http://www.ctps.org/lrtp.

capacity management/mobility; clean air/clean communities; transportation equity; and economic vitality. It envisions the use of new technology and prioritizes safety, equitable access, mobility, and varied transportation options.

The plan also envisions the Boston metropolitan region as a continuing economic, educational, and cultural hub that contributes to a high quality of life. A high quality of life is supported by a well-maintained transportation system with safe, healthy, affordable, efficient, and varied transportation options, which in turn increase access to educational opportunities, jobs, and services. Increased opportunities to use active or high-occupancy modes of transportation can also reduce emissions of greenhouse gases and other pollutants, improving air quality and reducing the overall environmental impact attributable to the transportation sector. This vision is possible through attentive maintenance, cost-effective management, and strategic investment in the region's transportation system.

As a member of the MPO Board, Massport is an active participant in the development of the Boston MPO's long-range transportation plan. The plan's vision is broad-based; more specifically for the Airport, the long-range vision finds that support for air cargo is critical.

Focus40

Focus40 is the 25-year investment plan for the Massachusetts Bay Transportation Authority (MBTA) to meet the needs of the Boston Region through the year 2040. The Focus40 plan was released in draft form in March 2019. The plan considers all rapid transit, commuter rail, bus, ferry, and paratransit services.[31] The plan developed "a long-term investment strategy that recognizes both today's infrastructure challenges as well as the shifting demographics, changing climate, and evolving technologies that may collectively alter the role the MBTA will play in the Greater Boston of the future."[32] Massport actively participated in the Focus40 planning process to provide input on the role of Logan Airport and other Massport assets.

Massachusetts State Freight Plan

In 2016, MassDOT began the process of preparing a new, comprehensive Massachusetts State Freight Plan to look at the near-term and long-term vision for the freight system in Massachusetts. MassDOT released a final draft plan, which was approved by the Federal Highway Administration in 2017. The new plan will include all freight modes, including air, rail, truck, and maritime. This plan will help document and guide Massport's freight planning work at Logan Airport, the Port of Boston, and Massport's other assets. The plan includes the designation of new miles of Critical Urban and Rural Freight Routes to the National Highway Freight Network, improving connections to Logan Airport and Massport maritime facilities. The State Freight Plan will also assist in identifying cargo trends. For example, the 2010 Massachusetts State Freight Plan[33] found that air freight shipping will grow more quickly than any other shipping mode. Massport was actively engaged in the Statewide Freight Plan public process as a member of the leadership Freight Advisory Committee.

31 Transportation for persons with disabilities to supplement public transportation systems.
32 Massachusetts Department of Transportation. 2018. *Focus40*. https://www.mbtafocus40.com/.
33 Massachusetts Department of Transportation. September 2010. *State Freight Plan*. https://www.mass.gov/service-details/freight-plan.

Massachusetts State Rail Plan[34]

In 2010, MassDOT developed the first State Rail Plan to guide planning and investment in freight, commuter, and passenger rail services across Massachusetts. The current plan, which was issued in 2018, lays out a 20-year vision and a four-year action plan describing policies, planning, infrastructure, and investment to guide the state's rail system. Massport advised and supported MassDOT on this plan.

Regional Cooperative Planning Efforts

Massport participates in regional transportation planning efforts, which are listed below.

New England Regional Airport System Plan (NERASP)[35] – Commercial Service Airports

In fall of 2006, the FAA New England Region, in concert with the New England Airport Directors and New England State Aviation Directors, completed the NERASP.[36] The results of this study describe the foundation of a regional strategy for the air carrier airport system to support the needs of air passengers through 2020. To date, the development of that strategy has been instrumental in facilitating the investment and development of the primary commercial airport system in New England.

New England Regional Airport System Planning – General Aviation (NERASP-GA)

While preparing the 2006 NERASP study, the group recognized that a similar evaluation of GA would provide a greater understanding of infrastructure investment, as well as a common understanding of state airport systems in relation to the New England region as a whole. New England and state aviation officials, in partnership with the FAA, conducted a study of the GA airport system in New England, which includes primary commercial service airports that provide a GA service component. Assisted by this information, the FAA will be better positioned to make decisions regarding priority capital investments in the context of rising airport and aircraft operational costs, declining operational activity, aging infrastructure, and limited state funds to address improvements. The 2015 study, *The Evolving Role of our General Aviation Airports and Their Significance to New England* can be found at https://www1.maine.gov/mdot/aviation/docs/neraspgasummarybrochure.pd.pdf.[37]

Local Planning Efforts

At a local level, Massport engages with municipalities, particularly the City of Boston, to coordinate on transportation planning and land use issues. Three recent plans, released by the City of Boston and discussed below, provide a relevant policy framework.

34 Massachusetts Department of Transportation. 2018. *State Rail Plan*. https://www.mass.gov/service-details/rail-plan.

35 Information on the NERASP-GA study can be found at https://www.faa.gov/airports/new_england/planning_capacity/airport_system_plan/.

36 The *New England Regional Airport System Plan* (NERASP), which was published by the FAA in 2006, includes Logan International Airport and these 10 regional airports: Bangor International, Bradley International, Burlington International, Hanscom Field, Manchester-Boston Regional, Portland International, Portsmouth International, T.F. Green, Tweed-New Haven, and Worcester Regional airports.

37 The Evolving Role of our General Aviation Airports and Their Significance to New England - A Profile of the New England General Aviation Airports: Phase 1 Summary of Findings, September 2015, prepared for New England State Aviation Directors by Louis Berger, Airports Solutions Group, and ICF International.

Imagine Boston 2030

Imagine Boston 2030, the City of Boston's comprehensive plan, commenced in the fall of 2015 and was published in July 2017. This latest citywide plan provides a policy framework for future development in Boston, addressing key themes including: housing, mobility, climate adaptation, open space, equity, arts and culture, design and placemaking, and health. Many themes addressed in this plan will inform Massport's planning efforts. At the same time, Massport continues to engage with the City of Boston and other stakeholders to shape the implementation of relevant strategies.

GoBoston 2030

The City of Boston's long-range transportation plan, GoBoston 2030, is intended as both a visioning and action plan to guide transportation planning policy and infrastructure investments through 2030. The plan, released in 2017, expresses three guiding principles: equity, economic opportunity, and climate responsiveness, as well as primary goals and aspirational targets. These targets include expanding access to transportation options, improving safety, reducing commute times, and promoting mode shift. To meet these aspirational targets, the plan prioritizes capital investments in transportation improvements. Many of these transportation planning initiatives will impact Massport's facilities and include projects for which Massport is a key stakeholder.

Climate Ready Boston

Climate Ready Boston is an ongoing initiative to guide Boston toward a more affordable, equitable, connected, and resilient future. Components of the Climate Ready Boston plan include: updating climate projections (e.g., extreme temperatures, sea level rise, and precipitation); completing vulnerability assessments; identifying impacts to focus areas; and creating more climate resiliency initiatives through policy, planning, and financial initiatives. Climate Ready Boston is coordinated with Imagine Boston 2030 and Go Boston 2030. In December 2016, the study report was released and followed by neighborhood implementation strategies in 2017 and 2018.

Conference of New England Governors (CONEG) and the Conference of New England Governors and Eastern Canadian Premiers (NEG/ECP)

The CONEG is a formally established body that coordinates regional policy programs in the areas of economic development, transportation, environment, energy, and health, among others. The CONEG also provides secretarial support to the separate Conference of New England Governors and Eastern Canadian Premiers (NEG/ECP). The latter coordinates policies of common interest across borders including infrastructure, energy, the environment, economic development, and trade. The CONEG offers a forum for policy on aviation and intercity passenger rail, particularly in the northeastern coastal mega-region, as part of a larger transportation system that needs modal balance. Efficient use of this multi-state network affects the overall viability of the highway, aviation, freight, and commuter rail transportation networks that serve the region and the nation. Improved planning coordination between airports and intercity passenger rail services and related ground transportation offers the potential to achieve complementary investments in airport and rail capacity and services.

MassDOT has a representative on the NEG/ECP Transportation and Air Quality Committee, which covers regional transportation issues and infrastructure development, use, and efficiency. The NEG/ECP and other

policy decision makers throughout the region have been able to utilize strategies and information developed in the NERASP, which provides a framework for integrated regional aviation policy and planning. This organization helps to achieve a greater balance between air, rail, and auto trips, and ultimately increase overall transportation capacity without overburdening Logan Airport and the New England aviation system.

In 2015, the NEG/ECP passed and implemented the *Climate Change Action Plan,* which provided direction on reducing greenhouse gas emissions and a target range of at least 35 to 45 percent below 1990 levels by 2030.[38] Since 1973, the six New England states and the five Eastern Canadian provinces have worked cooperatively to address their shared interests across the border. Through the annual conferences of governors and premiers and discussions of joint committees, NEG/ECP encourages cooperation by:

- Implementing adaption strategies;
- Building resilience into infrastructure;
- Developing networks and relationships;
- Taking collective action;
- Engaging in regional projects;
- Undertaking research; and
- Increasing public awareness of shared interests.

Among the topics recently addressed by the governors and premiers are:

- Ensuring a clean, efficient, and reliable energy future for the region;
- Invoking energy innovation for a competitive economy via energy diversification and storage;
- Changing global energy markets and the region's energy landscape;
- Encouraging business-to-business programming;
- Cross-border partnerships for economic development and trade liberalization;
- Transportation and air quality;
- Climate change action plans and greenhouse gas emission reduction strategies;
- Energy-efficient vehicle and infrastructure technologies; and
- Cross-border mutual aid in emergency planning.[39]

38 Conference of New England Governors and Eastern Canadian Premiers. August 30, 2015. *Resolution 39-1, Resolution Concerning Climate Change*.

39 Coalition of Northeastern Governors. 2019. *New England Governors/Eastern Canadian Premiers*. http://www.coneg.org/negecp.

Regional Rail Transportation Initiatives

This section reports on recent developments and current rail service originating in Boston, the status of air-rail linkages in the NEC, and the expanding Pilgrim Partnership, which provides commuter rail between Massachusetts and Rhode Island. While information in the following subsections reflects conditions as of 2019, current conditions and ridership may differ because of service adjustments and changes in demand due to the COVID-19 pandemic.

Amtrak Northeast Corridor (NEC)

Amtrak's NEC is an intercity rail line that operates between Boston-South Station and Washington, DC via New York City. Other major destinations served by the route include Providence, Rhode Island; New Haven, Connecticut; Philadelphia, Pennsylvania; and Baltimore, Maryland. Logan Airport passengers can connect directly to Boston-South Station via Silver Line bus rapid transit (BRT) service or via taxi or other unscheduled mode. Amtrak operates two services between Boston and Washington, DC: the Acela Express (high-speed, limited-stop service) and the Northeast Regional (lower-speed service that makes local stops along the route). Travel times on the Acela Express range from approximately 3.5 hours from Boston to New York to approximately 6.75 hours from Boston to Washington, DC. Travel times on the Northeast Regional range from about 4.25 hours from Boston to New York to approximately 7.75 hours from Boston to Washington, DC. On weekdays, a total of 19 daily departures are offered from Boston-South Station to New York-Penn Station, of which about half are Acela Express. On Saturdays and Sundays, a total of 12 departures and 15 departures are offered from Boston-South Station to New York, respectively.[40] Most trips continue south to Washington, DC, and a smaller number of Northeast Regional trains continue further south to Central and Eastern Virginia.

System-wide Amtrak ridership was 31.7 million trips in FY 2018 and 32.5 million trips in FY 2019.[41, 42] In FY 2018, the NEC carried 12.1 million passengers on its Acela Express and Northeast Regional services, up about 1 percent from the prior year. Acela Express accounted for more than 3.4 million passengers, while the Northeast Regional accounted for 8.6 million passengers. In FY 2019, the NEC carried 12.5 million passengers on those services, up about 3 percent from the prior year. Acela Express accounted for nearly 3.6 million passengers, while the Northeast Regional accounted for approximately 8.9 million passengers. Overall NEC ridership reached a new record in 2019, surpassing record levels each of the previous three years and representing a 4 percent growth as compared to 2017 ridership. Amtrak's share of the Northeast total passenger market has increased substantially since the introduction of Acela Express service in 2000. This share may rise as Amtrak introduces new rail cars into service over the next five years, replacing the old "Amfleet I" cars on the NEC with contemporary rail equipment.[43] Amtrak will also introduce next-generation Acela rail cars (scheduled to enter service in 2021), which will increase the number of seats per train by 27 percent.[44]

40 Amtrak. 2019. Train Schedules and Timetables. https://www.amtrak.com/train-schedules-timetables.
41 Amtrak. September 2018. *Amtrak Facts*. https://www.amtrak.com/national-facts.
42 Amtrak. *FY 2019 Company Profile*. https://www.amtrak.com/national-facts.
43 Amtrak. "*Amtrak Five Year Equipment Asset Line Plan: Base (FY 2019) + Five Year Strategic Plan (2020-2024)*," https://www.amtrak.com/content/dam/projects/dotcom/english/public/documents/corporate/businessplanning/Amtrak-Equipment-Asset-Line-Plan-FY20-24.pdf.
44 Ted Mann for The Wall Street Journal. May 12, 2019. "Next-Generation Acela Rail Cars Taking Shake in N.Y. Factory." https://www.wsj.com/articles/next-generation-acela-rail-cars-taking-shape-in-n-y-factory-11557662401.

Northeast Corridor Capital Investment Program and Next-Generation High Speed Rail Plan

The *Northeast Corridor Infrastructure Master Plan*, a regional rail planning study, was released in May 2010. The Master Plan[45] documents NEC growth needs through 2030, including expanded capacity and improvements in Boston-New York and New York-Washington intercity travel times. Forecasted growth and corresponding investment needs over the 20-year study period include: a 76 percent increase in rail ridership from 13 million to 23 million,[46] a 36 percent increase in train movements from 154 average weekday to 210 average weekday, and $52 billion in additional capital investment.

To follow up on the release of the *Northeast Corridor Infrastructure Master Plan*, Amtrak also unveiled a next-generation high-speed rail proposal in September 2010, titled *A Vision for High-Speed Rail in the Northeast Corridor*. The proposal outlines a brand-new 427-mile two-track corridor running from Boston to Washington, DC, offering high-speed rail service with sustained maximum speeds of 220 mph. Operations simulations estimate 83-minute trip times between Boston and New York by 2040 and 3-hour and 23-minute trip times between Boston and Washington, DC. Under this Next-Generation high-speed rail plan, the New York City – Boston market would see a further shift in demand from auto and air to rail due to the dramatic improvements in rail travel times, and the air market between the two city-pairs is projected to be nearly eliminated by 2050.[47] This plan states that traveler's shift to high-speed rail would reduce delays on competing modes (air and auto) and the shift away from shorter and smaller intraregional flights would free up air transport capacity for higher-value transnational and international flights.[48]

An update to the *Northeast Corridor Infrastructure Master Plan* and *A Vision for High-Speed Rail in the Northeast Corridor* was released in July 2012. Since these two documents were released, the two programs have been integrated into a single coherent service and investment program, called the Northeast Corridor Capital Investment Program. The Northeast Corridor Capital Investment Program would advance the near-term projects outlined in the Master Plan to benefit the NEC, while incrementally phasing improvements to the Acela Express high-speed service to support the proposed next-generation high-speed rail.[49] The near-term NEC improvements, which include new equipment for high-speed trainsets, are identified to occur between 2012 and 2025, and the long-term Next-Generation High-Speed Rail improvements are identified to occur between 2025 and 2040. The publication of the 2012 update is the first step in "improving the NEC for all users in order to sustainably support the population and economic growth facing the Northeast over the next 30 years," but a considerable amount of additional planning work is required by all stakeholders.[50] The Federal Railroad Administration (FRA) prepared a comprehensive plan for the NEC, entitled NEC FUTURE. The FRA has worked closely with NEC states, railroads, stakeholders, and the public to define a long-term vision for the corridor's future. In July 2017, the FRA issued the Record of Decision for NEC FUTURE, which describes the

45 The NEC Master Plan Working Group. 2017. *The Northeast Corridor Infrastructure Master Plan*. https://nec.amtrak.com/resource/northeast-corridor-infrastructure-master-plan/northeast-corridor-infrastructure-master-plan/.

46 Includes ridership on Amtrak and state rail lines but excludes ridership on commuter rail lines.

47 Amtrak. September 2010. *A Vision for High-Speed Rail in the Northeast Corridor*. http://www.america2050.org/upload/2011/04/Amtrak_NECHSRReport92810RLR.pdf.

48 *Ibid.*

49 Amtrak. July 2012. *The Amtrak Vision for the Northeast Corridor: 2012 Update Report*. http://www.gcpvd.org/wp-content/uploads/2012/07/Amtrak_Amtrak-Vision-for-the-Northeast-Corridor.pdf.

50 *Ibid.*

vision.[51] The FRA will work with the NEC Commission, as well as states and railroads, on service development planning in support of this vision.

In 2017, the Rhode Island Department of Transportation (RIDOT) and Amtrak completed work on the Kingston Station Capacity Expansion project. The project included construction of a third track at Kingston Station, enabling higher speed Acela trains to safely bypass regional trains.[52] The project supports improvements to train operations and the passenger experience along the Rhode Island stretch of the Northeast Corridor.

RIDOT is also planning improvements to Providence Station, including interior and exterior station enhancements. This project will rehabilitate the station, create capacity, and provide a higher level of service to support increased demand.[53,54]

Northern New England Intercity Rail Initiative

Completed in 2016, the Northern New England Intercity Rail Initiative is an interstate, interagency collaboration between MassDOT, the Vermont Agency of Transportation, and ConnDOT "to examine the benefits, opportunities, and impacts of more frequent and higher speed intercity passenger rail service on two major rail corridors."[55] The studied corridors are the Inland Route (between South Station and Western Massachusetts via Worcester and Springfield) and the Boston to Montreal Route. The study evaluated ridership, environmental impacts, and service plans of the 470 miles along these two corridors.

Boston-South Station Expansion

In support of the Northeast Corridor Capital Investment Program, MassDOT is planning to expand Boston's South Station Rail Terminal capacity and related layover capacity to meet current and anticipated future (2035) high-speed, intercity, and commuter rail services needs on the NEC and on the MBTA's South Side commuter rail system. At present, South Station operates above its design capacity for efficient train operations and orderly passenger queuing. Operating with only 13 tracks, South Station constrains the current and future rail mobility within Massachusetts and throughout New England and the NEC.[56] The proposed South Station Expansion Project will result in a number of benefits to rail mobility, including:[57]

- Growth in passenger rail transportation along the NEC and within Massachusetts;
- Improved service reliability through updates to rail infrastructure and related layover capacity;
- Improved passenger capacity and experience of using South Station;

51 Available online at: https://www.fra.dot.gov/necfuture/project_docs/reports.aspx.

52 Amtrak. *Kingston Station Capacity Expansion*. https://nec.amtrak.com/content/kingston-station-capacity-expansion.

53 Reed, Jack. "Reed Delivers New Federal Funds for $25 Million Upgrade to Modernize Providence Rail Station," August 19, 2019. https://www.reed.senate.gov/news/releases/reed-delivers-new-federal-funds-for-25-million-upgrade-to-modernize-providence-rail-station.

54 U.S. Department of Transportation, "U.S. Transportation Secretary Elaine L. Chao Announces $272 Million in 'State of Good Repair' Program Grants 10 projects in 10 states to receive funding," August 21, 2019. https://www.transportation.gov/briefing-room/us-transportation-secretary-elaine-l-chao-announces-272-million-%E2%80%98state-good-repair%E2%80%99.

55 Massachusetts Department of Transportation. Northern New England Intercity Rail Initiative. http://www.massdot.state.ma.us/northernnewenglandrail/Home.aspx.

56 Massachusetts Department of Transportation. *About this Project.* http://www.massdot.state.ma.us/southstationexpansion/Home.aspx.

57 Massachusetts Department of Transportation. October 2017. *South Station Expansion Final Environmental Assessment and Section 4(f) Determination.* https://www.massdot.state.ma.us/southstationexpansion/Documents/FinalEnvironmentalAssessment.aspx.

- City-building in a key area of Boston; and
- Reopening of Dorchester Avenue for public use and enjoyment for the first time in decades.

The Massachusetts Environmental Policy Act (MEPA) environmental review process for this project concluded with the issuance of a Secretary's Certificate on August 12, 2016 on the Final Environmental Impact Report (FEIR).[58] The National Environmental Policy Act (NEPA) environmental review process for this project concluded with the issuance of a Final EA and Section 4(f) Determination and Finding of No Significant Impact (FONSI) on October 27, 2017.[59] Prior to issuance of the final EA, FRA and MassDOT had collected comments on the Draft EA and Draft Section 4(f) Determination for a 30-day public comment period, which concluded May 27, 2017. The draft document was circulated to agencies, project stakeholders, and individuals on the project distribution list for review and comment. Written responses to comments were provided in the FONSI.

In August 2019, the U.S. Department of Transportation awarded MassDOT a grant to improve South Station's Tower 1 interlocking, critical infrastructure that distributes trains to and from the station.[60] This early action project will provide immediate operating benefits once completed and will improve reliability and resiliency.

North-South Rail Link

Boston is served by two commuter rail systems, one extending to the north of the city, the other to the south. They are disconnected from each other, limiting north to south connectivity for the MBTA commuter rail system as well as Amtrak's intercity rail system. The North-South Rail Link is a proposed pair of rail tunnels that would connect North and South Stations in downtown Boston. MassDOT completed a Draft Environmental Impact Report (DEIR) between 1995 and 2003, but the project was not pursued at that time. MassDOT recently completed a Feasibility Reassessment for the North-South Rail Link Project to update the prior work and inform MassDOT's and state policy makers' decisions about appropriate next steps for the proposed project. The North-South Rail Link Feasibility Reassessment Draft Report was released in September 2018.[61]

58 Massachusetts Department of Transportation. June 2016. *South Station Expansion Final Environmental Impact Report.* http://www.massdot.state.ma.us/southstationexpansion/Documents/FEIR.aspx.

59 Massachusetts Department of Transportation. October 2017. *South Station Expansion Final Environmental Assessment and Section 4(f) Determination and Finding of No Significant Impact.* https://www.massdot.state.ma.us/southstationexpansion/Documents/FinalEnvironmentalAssessment.aspx.

60 Massachusetts Department of Transportation. *South Station Expansion – Study Update.* https://www.mass.gov/service-details/south-station-expansion-study-update.

61 Available online at: https://www.mass.gov/lists/north-south-rail-link-feasibility-reassessment-study-documents.

East West Rail Study

MassDOT is conducting a study to examine the costs, benefits, and investments necessary to implement passenger rail service from Boston to Springfield and Pittsfield, with the speed, frequency, and reliability necessary to be a competitive option for travel along this corridor. The study will assess up to six alternatives, which will feature a range of approaches including high speed rail and potential infill stations.[62] MassDOT released a draft of the study report in October 2020 for public comment.

Commuter Rail Services

The Pilgrim Partnership is an arrangement between the MBTA and RIDOT, under which RIDOT allocates some of its federal funding to the MBTA in return for commuter rail service between Boston and Rhode Island, and new equipment purchases and improvements to facilities in Massachusetts. The Pilgrim Partnership provides residents in the greater Boston area with improved access to jobs located in Providence. On weekdays, 20 round trips are provided between Boston and Providence. On Saturdays, nine round trips are provided between Boston and Providence, while seven round trips are provided on Sundays.[63] Expanded weekday commuter rail service to T.F. Green Airport in Warwick, Rhode Island was introduced in December 2010, which provides more options for inter-city travel for Boston residents and costs passengers $12.75 each way. Travel time between Boston and Warwick is approximately 1.3 to 1.7 hours. On weekdays, eight of the 20 daily outbound trips from Boston to Providence currently continue to Warwick as well as Wickford, Rhode Island. Expanded weekday service to Wickford, Rhode Island commenced in 2012, with a potential extension further into South County as service in the state expands and ridership grows. Additionally, RIDOT, in cooperation with the City of Pawtucket, is currently investing $40 million in the construction of a new commuter rail station in Pawtucket, Rhode Island, which will serve MBTA commuter trains. The new Pawtucket-Central Falls Commuter Rail Station is scheduled to open in 2022.

The expansion of commuter rail service into Rhode Island enhances ground access options from the Boston metropolitan area to T.F. Green Airport. The passenger catchment areas of T.F. Green Airport and Logan Airport overlap, and this commuter rail service has the potential to attract passengers in the overlapping catchment area who live along the MBTA's Providence Line to T.F. Green Airport.

Massachusetts officials cleared funding hurdles in April 2019 to begin expansion of MBTA commuter rail service to major cities like New Bedford and Fall River (located within approximately 50 miles of Boston and without regular commuter rail service to the capital) via the South Coast Rail corridor. This two-phase, $3.42-billion construction will extend the existing Middleborough Line from Boston and bring six new stations and two new layover facilities, with a target date for operational service for Phase I ($1.05 billion) by late 2023.[64] The first phase includes reconstruction of existing tracks and upgrades to the Middleborough Secondary track. The second phase of the project will provide service to the South Coast through the Town of Stoughton. Some

62 Available online at https://www.mass.gov/east-west-passenger-rail-study

63 Massachusetts Bay Transportation Authority. 2019. Providence/Stoughton Timetable. https://www.mbta.com/schedules/CR-Providence/timetable.

64 Chris Lisinski, State House News Service, for WBUR. 2019. "Permit, Funding Hurdles Cleared for South Coast Rail." https://www.wbur.org/bostonomix/2019/04/23/south-coast-commuter-rail-permit-funding.

service will begin in 2023, but several portions of the project are expected to reach completion no sooner than 2030.

In October 2019, the MBTA launched a one-year pilot to test weekday commuter rail service to Foxboro. The MBTA operated 10 daily round-trips as part of the Service Pilot, with 500 parking spaces available at Foxboro Station. The MBTA suspended the service pilot in 2020 as part of service changes across the commuter rail system as a result of the COVID-19 pandemic.

MBTA Rail Vision

The MBTA's Rail Vision planning study identified cost-effective strategies to transform the MBTA's existing Commuter Rail system to better support improved mobility and economic competitiveness in the Boston region. The study evaluated how best to serve riders and determined which investments support the final vision. The project identified and evaluated six alternatives for a future MBTA rail system to understand the costs, ridership potential, and operational feasibility of these alternatives. The results of this evaluation were presented at a public meeting in late 2019. The evaluation, enhanced by broad public conversation in 2019, will inform the ultimate vision for the future of the MBTA rail system.[65]

Other Regional Cooperative Planning Efforts

Recognizing that Logan Airport is a substantial trip generator and key transportation resource in the metropolitan area, Massport participates in several interagency transportation planning forums that strive to enhance a variety of travel modes.

South Boston Waterfront Transportation Plan

Massport, the City of Boston, MassDOT, and the Massachusetts Convention Center Authority all participate in and manage the new sustainable transportation plan for the South Boston Waterfront. The resulting plan, featuring an unprecedented collaboration of the private and public sectors, is a blueprint for improving the growth of the Waterfront, proposing solutions to meet the growing and changing transportation needs of the district, and improving the public realm of the area, all while preserving the quality of life for the surrounding neighborhoods. The plan benefitted from the input of area stakeholders through five community meetings and more than 50 outreach meetings throughout the process. Massport continues to engage in implementation of recommendations from this plan, in collaboration with other agency partners.

The City of Boston published the *Coastal Resilience Solutions for South Boston* report in October 2018. This plan presents near-term and long-term visions for reducing risk due to sea level rise and coastal flooding in South Boston. This is the second neighborhood coastal resilience plan to come out of the Climate Ready Boston initiative.

Water Transportation Advisory Council and Ferry Study

Massport participates in planning for water transportation in the Boston region as a member of the Water Transportation Advisory Council, convened by MassDOT. Massport also participated in a comprehensive study of commuter, recreational, and landside access needs to support water transportation in Boston Harbor, which was completed in April 2019. The study identified three potential corridors for water transportation service and

65 Massachusetts Bay Transportation Authority. *Rail Vision*. https://www.mbta.com/projects/rail-vision.

developed business plans to assess ridership and implementation feasibility. Massport served on the steering committee for this study led by Boston Harbor Now with support from MassDOT and other stakeholders.

Boston Metropolitan Planning Organization (Boston MPO)

Massport supports multimodal transportation planning and improved integration of its facilities with Boston area transportation through its permanent voting membership on the Boston MPO and by providing input on the Boston MPO's policy and programming decisions.

MPOs are established in large metropolitan areas and are responsible for conducting a federally required cooperative, comprehensive, and continuous metropolitan transportation planning processes. Based on this planning, MPOs determine which surface transportation system improvements will receive federal capital (and occasionally, operating) transportation funds. The Boston MPO´s mission is to establish a vision and goals for transportation in the region and then develop, evaluate, and implement strategies for achieving them.

Massport plays an active role on the MPO's decision making board, participating in policy decisions related to the *Long-Range Regional Transportation Plan,* and project programming for the Transportation Improvement Program. The MPO also guides the work conducted by Central Transportation Planning Staff (CTPS) via its Unified Planning Work Program. CTPS also supports Massport's ground transportation planning initiatives.

Metropolitan Area Planning Council (MAPC)

Massport is also an ex-officio member of the Executive Committee of MAPC, a regional planning agency that serves the people who live and work in the cities and towns of Metropolitan Boston. The MAPC mission is to promote smart growth and regional collaboration, which includes protecting the environment, supporting economic development, encouraging sustainable land use, improving transportation, ensuring public safety, advancing equity and opportunity among people of all backgrounds, and fostering collaboration among municipalities. MAPC membership includes 101 municipal government representatives, 21 gubernatorial appointees, 10 state officials (including Massport), and three City of Boston officials. A staff of approximately 40 individuals supports the Council and its Executive Committee of 25 selected members.

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Ground Access to and from Logan Airport

This *2018/2019 Environmental Data Report (EDR)* was filed during the ongoing COVID-19 worldwide pandemic. Flights in and out of Logan Airport are dramatically reduced and passenger levels dropped over 90 percent during spring 2020. As a result, there are far fewer aircraft operations and passengers and a dramatic drop in overall Logan Airport activity. While activity levels began a slow recovery in mid-summer 2020, the ongoing wave of COVID-19 cases has resulted in continued historically low levels of activity, with a full recovery years away. As of October 2020, total flight operations for the year were down by 50 percent and passenger levels were down by about 70 percent compared to January through October 2019.

As a result, while passenger numbers are beginning a slow recovery, there are far fewer passengers and employees traveling to and from Logan Airport and there is far less roadway congestion both in Boston and the metropolitan area. In addition, the public's interest in using high-occupancy vehicle (HOV) transportation services like buses, rapid transit and commuter rail, has also been significantly affected by concerns about COVID-19. Within that context, Massport continues to evaluate and plan for the recovery of air passenger activity and remains committed to implementing the broad range of ground access strategies that are outlined throughout this chapter. Massport continues to carefully review both on and off-Airport activity levels and will adjust its ground access programs to align with ridership levels. The schedule for HOV and ground access improvements will be adjusted due to the current conditions. Massport remains committed to implementing project-related mitigation strategies, as documented in Chapter 9, *Environmentally Beneficial Measures and Project Mitigation Tracking*.

Key Findings for 2018 and 2019

- Boston Logan International Airport (Logan Airport or the Airport) continues to be one of the top U.S. airports in terms of high-occupancy vehicle (HOV) and transit mode share. The Massachusetts Port Authority (Massport) promotes numerous HOV, transit, and shared-ride options to improve on Airport roadway and curbside operations, alleviate constraints on parking, and improve customer service. Key initiatives include:
  - A goal to double Logan Express ridership, by the time Logan Airport reaches 50 million passengers, by expanding parking, frequency, and facility upgrades;
  - Massport plans to purchase eight Massachusetts Bay Transportation Authority (MBTA) Silver Line buses as part of a forthcoming MBTA procurement; and
  - Implementation of a RideApp (e.g., Uber and Lyft, previously referred to as transportation network companies [TNCs]) management plan to reduce congestion on-Airport, including a focus on ride rematch[1] and shared-ride.
- Average weekday on-Airport vehicle miles traveled (VMT) increased by about 4.5 percent from approximately 196,500 in 2017 to 205,344 in 2018. Between 2018 and 2019, average weekday on-Airport VMT increased by 2.2 percent to 209,900. The change in average daily traffic can be attributed primarily to the increases in air passenger activity, passenger drop-off/pick-up, cargo, and non-aviation related Airport uses. It is anticipated that the Airport activity and on-Airport VMT will be lower in 2020 due to the impact of COVID-19.
- RideApp transactions totaled more than 7 million in 2018 and increased to over 8 million in 2019, growth of over 16 percent. RideApps are impacting other access modes to the Airport and contributing to on-Airport congestion.
- Partially due to the continued rise of RideApp activity, the number of black car limousines and scheduled van seats coming to the Airport dropped by nearly 23 percent from 2017 to 2019. Taxi dispatches declined 14 percent in 2018 compared to 2017 and 7 percent between 2018 and 2019. MBTA Blue Line ridership increased by 4 percent between 2017 and 2018 and declined by 29 percent the following year.
- In 2017, the Logan Airport Parking Freeze was amended to allow for an increase of up to 5,000 on-Airport commercial parking spaces, which was the first step in allowing for the construction of additional parking to reduce drop-off/pick up modes and alleviate constrained on-Airport parking conditions. In January 2020, Massport received the Final Environmental Impact Report (FEIR) certificate from the Secretary of the Executive Office of Energy and Environmental Affairs (EEA), completing the environmental review process for the construction of 5,000 additional parking spaces. While the project has completed the environmental review process, construction of these additional parking spaces has been deferred.
- Massport has committed to a goal of 35.5 percent HOV by 2022 and 40 percent by 2027. Based on the results of the 2019 Air Passenger Ground-Access Survey, HOV mode share has reached 40.4 percent, exceeding both near-term and longer-term goals. COVID-19 has had a range of impacts on ground transportation, particularly on the use of ground-access HOV modes. While it is anticipated that the HOV mode share will drop as a result of COVID-19 over the short term, Massport remains committed to meeting the HOV mode share goals going forward.

1 Rematch allows drivers who are dropping off to instantly pick up another passenger without needing to circle the Airport or leave empty.

Introduction

Massport has a comprehensive, multi-pronged, trip reduction strategy to diversify and enhance ground transportation options for passengers and employees traveling to and from Logan Airport. The ground transportation strategy is designed to offer passengers traveling to and from Logan Airport with a choice of HOV, transit, and shared-ride options that are convenient and reliable, and that reduce environmental and community impacts.

The strategy also aims to provide sufficient on-Airport parking for air passengers choosing automobile access modes and/or who have limited HOV options. Improving the multimodal connectivity of the Airport can provide traffic and environmental benefits by reducing vehicle trips, VMT, and greenhouse gas (GHG) emissions associated with travel to and from Logan Airport. The cost, speed, convenience, safety, and reliability of all modes of transportation connecting to the Airport affect how passengers and employees choose among these access modes. Offering a range of ground access options also improves customer service for air passengers, employees, and other Airport users.

Along with reducing congestion and limiting impacts to the environment:

- Massport continues to invest in and operate Logan Airport with a goal of increasing the HOV mode share—the number of passengers (and Airport employees) arriving by transit or other HOV and shared-ride modes. Measures implemented by Massport to increase HOV use include initiatives related to pricing (incentives and disincentives), service availability, service quality, infrastructure improvements, marketing, and traveler information.
- Massport aims to reduce the number of private vehicles that access Logan Airport and, in particular, reduce the associated environmentally undesirable drop-off/pick-up modes, which generate up to four vehicle trips instead of two and contribute to greater terminal area roadway congestion.[2]
- Massport actively manages parking supply as another strategy to reduce drop-off/pick-up modes by promoting long-term rather than short-term parking (thus reducing the number of daily trips to Logan Airport); supporting efficient use of parking facilities; providing good customer service; and complying with the provisions of the Logan Airport Parking Freeze.[3]

In addition to highlighting more recent changes to ground transportation services, operations, and pricing, this chapter reports on ground access conditions and activity levels in 2018 and 2019, which are compared to past conditions. Activity levels include measures of ridership on various ground access modes and traffic volumes. The chapter provides an overview of parking demand and its impacts under Logan Airport's constrained parking supply. Regional transportation efforts related to the Airport, as well as planning efforts

2 If an air passenger is dropped off when departing on an air trip and is picked up upon return, that single air passenger generates a total of four ground access trips: two for the drop-off trip (one inbound to Logan Airport, one outbound from Logan Airport) and two for the pick-up trip (one inbound to Logan Airport, one outbound from Logan Airport). The air passenger may be dropped off and picked up in a private vehicle, taxi, RideApp, or a black car limousine and the vehicle may not carry a passenger during all segments of travel to and from Logan Airport.

3 310 Code of Massachusetts Regulations 7.30; 40 Code of Federal Regulations 52.1120.

to diversify transportation options in the New England region (primarily through high-speed, commuter, and passenger rail), are discussed in Chapter 4, *Regional Transportation*.

Ground Transportation Modes of Access to Logan Airport

The Logan Airport EDRs and Environmental Status and Planning Reports (ESPRs) provide over three decades of tracking and reporting on ground access and ground transportation at the Airport. Air passengers have a variety of options for getting to Logan Airport, including:

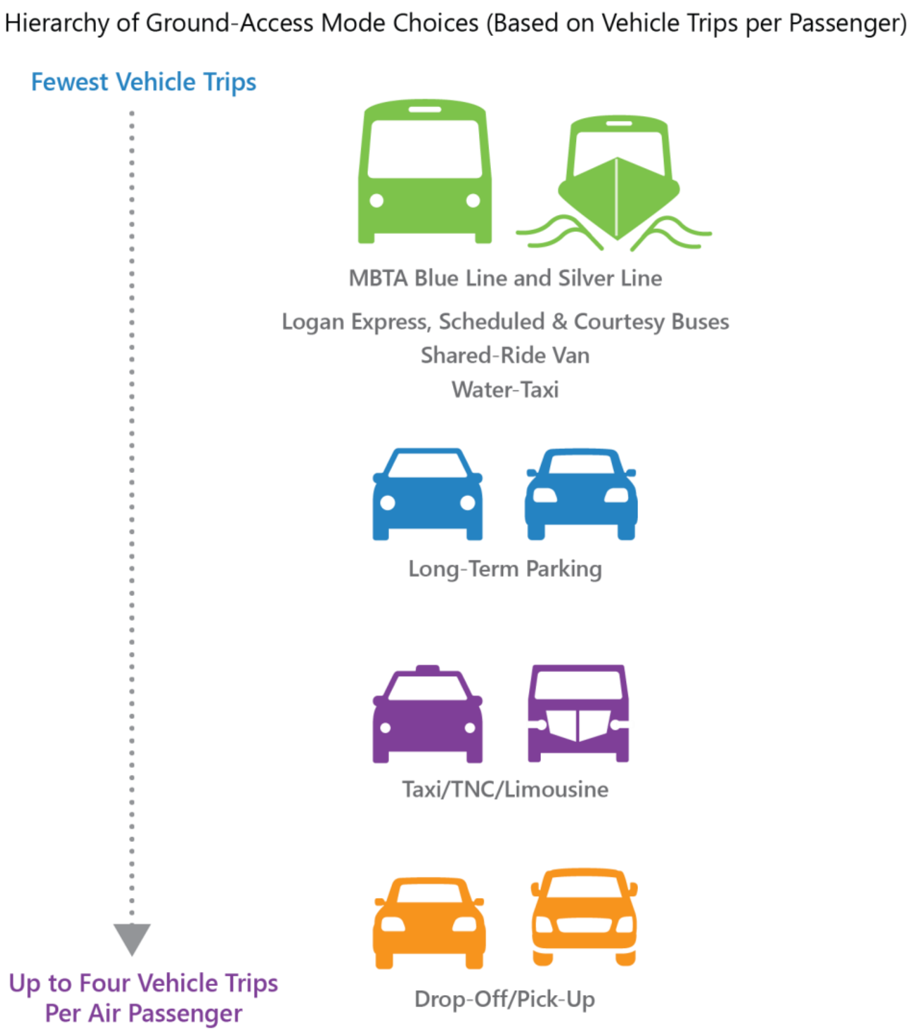
- Public transit (Massachusetts Bay Transportation Authority [MBTA] Blue Line subway, Silver Line bus rapid transit, other MBTA buses, and water transportation);
- Logan Express scheduled bus service;
- Scheduled buses and vans;
- Courtesy shuttle buses;
- Charter buses;
- Private automobiles;
- Unscheduled private black car limousines and vans;
- Taxis;
- Rental cars; and
- RideApps, such as Uber and Lyft.

Mobile application ride-booking services, such as Uber and Lyft, are increasingly becoming a mode of choice for ground access at airports throughout the country. In February 2017 (pursuant to Massachusetts state law, An *Act Regulating Transportation Network Companies* (Bill H.4570), and Massport *Rules for Safe and Efficient Operation of TNCs at Logan Airport* and in cooperation with state regulators), Massport began allowing RideApps to pick up arriving air passengers after entering a dedicated RideApp pick-up lot. This service was tracked for reporting beginning in 2017 and contributed an estimated 15,000 vehicle trips per day, excluding deadhead trips (deadhead trips are those trips to or from the Airport that do not contain a passenger). RideApp operations at the curb and on roadways are affecting ridership on HOV services and contributing to on-Airport congestion. Massport provided a comprehensive plan to address these impacts in the *2017 ESPR*, and a status update of that plan is provided later in this chapter.

Transit, HOV, and shared-ride modes are designed for efficient transport of multiple travelers. With a higher occupancy and bi-directional transport of air passengers (arriving at and departing from the Airport), the number of vehicle trips per passenger for these modes is comparatively low. On the other hand, private vehicles that park at the Airport (or an off-Airport lot) generate a single vehicle trip to the Airport for the departing air passenger and a single vehicle trip from the Airport for the arriving air passenger. Even less desirable, vehicles that do not remain on the Airport for an air passenger's trip duration, such as those private vehicles that have dropped off an air passenger at the curb, generate a trip to and a trip from the Airport for a departing air passenger and an additional two trips for the arriving passenger. Taxis, RideApps, and black

car limousines also produce deadhead trips when they depart Logan Airport empty after dropping off an air passenger (particularly in the morning) or arrive at the Airport empty to pick up air passengers. As **Figure 5-1** shows, when measured in terms of vehicle trips generated, the most environmentally desirable mode is HOV (transit and shared-ride), followed by drive-and-park, with the least desirable modes being drop-off and pick-up.

Figure 5-1 Ground Access Mode Choice Hierarchy



Source: VHB.
Notes: Short-term parking is included under "Drop-off/Pick-up."
Rental cars are included in the "Long-Term Parking" category.

2018/2019 On-Airport Vehicle Traffic: Volumes and Vehicle Miles Traveled (VMT)

This section reports on Logan Airport's traffic-related activity for 2018 and 2019, specifically:

- Gateway traffic volumes; and
- On-Airport VMT calculations.

Massport's leadership in and commitment to developing, promoting, and providing alternative means of ground transportation for access to and from Logan Airport are key to reducing gateway traffic volumes and on-Airport VMT. The diverse range of environmentally responsible ground transportation modes by which air travelers, employees, and other Airport users can access the Airport reduces reliance on automobile travel, minimizes traffic congestion, and contributes to improvements in air quality.

Gateway Traffic Volumes

Gateway roadways are defined as access points to and from Logan Airport, which primarily include Route 1A to and from the north, the Sumner and Callahan Tunnels (Route 1A to and from the south), the Interstate-90 Ted Williams Tunnel ramps (east/west), and Frankfort Street/Neptune Road. **Figure 5-2** shows the roadway infrastructure at Logan Airport in 2018 and 2019.

Data Collection and Annual Average Daily Calculation Method

All of the Airport's gateway roadways are equipped with permanent traffic count stations, as part of the Airport-wide Automated Traffic Monitoring System (ATMS). These stations provide data to calculate:

- Annual average daily traffic (AADT);
- Annual average weekday daily traffic (AWDT); and
- Annual average weekend daily traffic (AWEDT).

Since these data are automatically collected continuously throughout the year, seasonal adjustment factors are only necessary when significant gaps in the data occur (typically due to equipment failure/malfunction or construction activity). Seasonal adjustment factors, when used, are generally based on a combination of the monthly variation of counts from other ATMS stations or of the same station in the previous year.

Annual Average Daily Activity Levels

Table 5-1 summarizes the average daily gateway traffic volumes at Logan Airport for the years 2011, 2017 (the two most recent ESPR submission years), and 2018 through 2019. A full table with average daily gateway traffic volumes data for years 2010 through 2019 is found in Appendix G, *Ground Access to and from Logan Airport*. It includes AADT, AWDT, AWEDT, and annual air passengers, for reference.

The AADT entering and departing Logan Airport via its gateway roadways increased by 5.4 percent and 4.5 percent between 2017 and 2018 and between 2018 and 2019, respectively. The change in average daily traffic can be attributed primarily to:

- A 6.6- and 3.9-percent increase in air passenger activity in 2018 compared to 2017 and 2019 compared to 2018, respectively;
- The impact of RideApps, whose activity increased 16 percent between 2018 and 2019; and
- A general increase in drop-off/pick-up activity by private and commercial automobiles.

Although daily traffic volumes on the Airport roadway system have been increasing, it is important to place this growth in the context of overall Airport activity and Massport's efforts to promote HOV ground access. In 2019, air passenger volumes were approximately 47 percent higher than in 2011; while AADT volumes grew at approximately 38 percent over the same time period.

Growth in gateway traffic volumes is also partially attributable to growth in non-air passenger activity such as air cargo, aviation services, and other Airport activities. Even accounting for both non-air passenger and air passenger activity, the fact that gateway traffic volume is growing at a lower rate than air passenger volume reflects the use of HOV modes to access the Airport.

Table 5-1 Logan Airport Gateways: Annual Average Daily Traffic, 2011, 2017–2019

	AADT		AWDT		AWEDT		Annual Air Passengers	
Year	**Volume**	**Percent Change**	**Volume**	**Percent Change**	**Volume**	**Percent Change**	**Level of Activity**	**Percent Change**
2011	99,449	5.6%	104,863	6.0%	85,879	4.0%	28,907,938	5.4%
2017	124,646	4.1%	130,601	3.9%	109,723	5.0%	38,412,419	5.9%
2018	**131,432**	**5.4%**	**137,105**	**5.0%**	**117,425**	**7.0%**	**40,941,925**	**6.6%**
2019	**137,331**	**4.5%**	**143,189**	**4.4%**	**122,678**	**4.5%**	**42,522,411**	**3.9%**

Source: Massport.
Notes: Gateway roadways include access to/from: Route 1A (including the Sumner and Callahan tunnels), I-90/Ted Williams Tunnel, Frankfort Street/Neptune Road, and Maverick Street.
AADT Annual average daily traffic.
AWDT Annual average weekday daily traffic.
AWEDT Annual average weekend daily traffic.

FIGURE 5-2 Logan Airport Roadway Network

Parking Garages

Terminal Buildings

Airport Roadways

0 450 900 1800 Feet

On-Airport VMT

On-Airport VMT is calculated based on the total number of miles traveled by all vehicles on the Logan Airport roadway system. VMT is an important metric because it is used to calculate motor vehicle air quality emissions. It is also one indication of the level of traffic on roadways in specific areas and at specific times.

Calculation Method and Model Description

Over the past nine years, Massport has modeled on-Airport VMT using a VISSIM[4] microsimulation model, an upgrade to a previous model developed in 1994. This year, Massport created a new spreadsheet-based volumetric model to estimate on-Airport VMT. This model takes advantage of the data available through Massport's various transportation and transaction-based data collection systems. There are several benefits of using the new model over the previous VISSIM VMT model. The most noteworthy benefit the model brings is that it is based on actual hourly ground access activity data instead of depending on gross factors. For example, the previous VISSIM model used mode share data collected as part of the Logan Air Passenger Ground Access Survey to project the number of vehicles by mode to estimate the morning and evening peak period volumes and resultant VMT. Temporal factors were then applied to these volumes to project VMT during other analysis periods. While this method provides a reasonable estimate of general ground access modal use, it did not account for air passenger mode choice fluctuation throughout the day; which occurs due to a number of factors such mode availability and other time-based factors. Using hourly data does a better job of modeling these nuances and provides a more accurate estimate of air passenger ground access activities for all time periods.

To ease the transition, the new model is built around the previous roadway network and link configuration developed for the VISSIM model. The new model was run using 2017 data and the results were compared to the 2017 VISSIM model output. The VMT results from the new model (using 2017 data) were similar to the previous 2017 VISSIM and fell within a reasonable margin of error, given the change in methodology.

Estimated VMT Calculations and Modeling Results

Consistent with previous years, the following specific time periods were analyzed for 2018 and 2019:

- Morning peak hour;
- Evening peak hour;
- Highest consecutive 8-hour (High 8-Hour); and
- Average weekday VMT.

Table 5-2 summarizes the VMT estimates for Logan Airport-related traffic from 2018 and 2019 and provides 2011 and 2017 data for historical context. Absent any major shift in traffic volumes entering the gateways, the change in VMT is expected to generally mirror the change in traffic volume. The change in average weekday

4 PTV America. 2011. Verkehr In Städen Simulationsmodell – VISSIM version 5.40 [computer software].

VMT between 2017 and 2018 was approximately 4.5 percent, while gateway volumes increased by 5.4 percent. Weekday VMT increased by 2.2 percent between 2018 and 2019, while gateway traffic volume increased 4.5 percent. These increases can be attributed to three primary factors: increased air passenger demand, increased commercial and private drop-off/pick-up activity by passengers, and a change in general travel patterns to and from and within the Airport over the past several years. In 2018, Massport relocated the RideApp Pool from the Red Lot to the taxi pool location on Porter Street and moved the Taxi Pool to the Blue Lot (next to the Logan Office Center). In 2019, Massport relocated the gas station from Terminal E to the Red Lot, locating it closer to the Rental Car Center (i.e., rental car returns) and the limousine, taxi, and RideApp pools. Each of these relocations generally improved on-Airport routing by shortening the distances between key, active nodes. Details of the 2018 and 2019 VMT modeling results are presented in Appendix G, *Ground Access to and from Logan Airport*.

Table 5-2 Airport Study Area Vehicle Miles Traveled (VMT) for Airport-Related Traffic, 2011, 2017-2019

Analysis Year[1]	AM Peak Hour	PM Peak Hour	High 8-Hour	Average Weekday	Average Weekday Percent Change
2011	8,391	10,978	76,920	167,647	2.9%
2017	9,844	12,009	86,678	196,503	11.1%
2018	**9,452**	**12,447**	**91,450**	**205,344**	**4.5%**
2019	**9,477**	**12,577**	**91,336**	**209,900**	**2.2%**

Source: VHB and Massport.
1 Data provided for 2011 and 2017 used the previous VISSIM model. Data from 2018 to 2019 used the new VMT model discussed above.

2018/2019 Ground Transportation Ridership and Activity Levels

This section of the chapter:

- Provides an overview of transportation services available to Logan Airport users from the Boston metropolitan area;
- Reports on 2018/2019 ridership levels and recent historical trends;
- Reports on Massport's progress in meeting ground access goals; and
- Describes Massport's cooperative planning ventures with other transportation agencies in Massachusetts.

Logan Express, MBTA Transit, and Water Transportation Modes

Annual ridership levels for HOV, transit, and shared-ride transportation modes serving Logan Airport are summarized in **Table 5-3**.

Logan Express Bus Service

In 2018/2019 Massport provided frequent, scheduled, express coach bus service to Logan Airport for air passengers and Logan Airport employees from suburban park-and-ride lots in Braintree, Framingham, Woburn, and Peabody. Full-service bus terminals and secure parking were provided at all four locations. In addition, a pilot urban service from Back Bay was introduced. No customer parking is provided at the Back Bay location. **Figure 5-3** depicts Logan Express bus locations with respect to the regional transportation network.

Table 5-3 compares 2018 and 2019 ridership on Logan Express to the previous respective years. Notably, Logan Express passenger ridership from suburban park-and-ride locations increased by over 5 percent between 2017 and 2018 and over 14 percent between 2018 and 2019. Between 2017 and 2018, there continued to be a decrease in ridership to and from Back Bay, which has been a noted trend since the MBTA's Government Center Station reopened; however, Back Bay ridership grew in 2019, attributable to incentives such as security line preferences and discounted fares (free to Downtown Boston/$3 to the Airport). A detailed breakdown of Logan Express ridership is presented in Appendix G, *Ground Access to and from Logan Airport*.

At suburban locations, Logan Express operated daily between 4:00 AM to 11:00 PM, with some earlier and later bus service provided that varies by location and day of the week. The round-trip adult fare is $22, with reduced fares offered to seniors; children under the age of 17 ride for free. Parking rates at the facility park-and-ride lots were $7 per day. At the start of 2019, scheduled half-hour frequencies were provided between the Braintree and Framingham locations and Logan Airport on weekdays and Saturday/Sunday afternoon to evening. Starting mid-2019, Braintree Logan Express service increased frequency to three trips per hour. One-hour frequencies were provided at these locations on Saturday and Sunday mornings. Woburn provided half-hour bus service on weekdays and Sunday afternoon to evening, and hourly service all day Saturday and on Sunday mornings. Scheduled bus service to and from Peabody was provided hourly. In 2019, Massport increased total Logan Express seat capacity by over 10 percent.

While this report focuses primarily on activity in 2018 and 2019, as a result of the pandemic, a number of Massport's broad HOV and trip reduction measures temporarily changed in 2020. The COVID-19 pandemic has had a substantial impact on Massport operations including a dramatic reduction in the number of daily flights and an approximately 90 percent reduction in passenger levels in spring 2020. As a result, while operational and passenger levels have recovered somewhat as of mid-2020, overall, there are far fewer passengers and employees traveling to and from Logan Airport and there is far less peak period roadway congestion both in Boston and the metropolitan area. In addition, the public's interest in using HOV transportation services like buses, rapid transit and commuter rail, has also been significantly affected by concerns about the COVID-19 virus. Therefore, a dramatic decline in ridership was experienced on the Logan Express buses during the early months of the pandemic. Logan Express schedules were adjusted in March

2020 in response to the COVID-19 pandemic and this decline in ridership. As such, the schedule for implementing the action plan below has been adjusted. As a point of reference, Logan Express ridership is 84 percent lower in October 2020 compared to the same month the previous year.

Within that context, Massport continues to evaluate and plan for the recovery of air passenger activity and remains committed to implementing the broad range of ground access strategies that were outlined in the *2017 ESPR*. The schedule for those services and planned improvements has, however, been adjusted due to the continuing operational constraints and revenue reductions. Massport continues to carefully review both on and off-Airport activity levels and will adjust its ground access programs to align with ridership levels. Future EDRs will provide detailed updates on all service adjustments and activity levels.

Table 5-3 Annual Ridership and Activity Levels on Logan Express, MBTA, and Water Transportation Services, 2011, 2017–2019

	MBTA Transit		Logan Express Bus			Water Transportation[1]	
Year	**Blue Line[2]**	**Silver Line[3]**	**Air Passengers**	**Employees**	**Total**	**MBTA Ferry**	**Private Water Taxis**
2011	2,277,311	900,359	649,609	536,513	1,186,122	33,403	58,879
2017	2,197,783	N/A	1,140,235	695,504	1,835,736	7,424	83,689
2018	**2,295,250**	N/A	**1,182,097**	**750,574**	**1,932,671**	**6,609**	**77,813**
2019	**1,635,147**	N/A	**1,381,700**	**824,084**	**2,205,784**	**7,467**	**61,071**
Percent Change (2017-2018)	**4.4%**	**N/A**	**3.7%**	**7.9%**	**5.3%**	**(11.0%)**	**(7.0%)**
Percent Change (2018-2019)	**(28.8%)**	**N/A**	**16.9%**	**9.8%**	**14.1%**	**13.0%**	**(21.5%)**

Source: Massport.
Notes: Numbers in parentheses ( ) represent a decrease in annual ridership.
N/A Not available.
1 MBTA Ferry includes the Harbor Express F2/F2H service, Hingham/Hull-Logan and Long Wharf. Service from Quincy Fore River was suspended in 2013. Private water taxis include: City Water Taxi and Rowes Wharf Transport.
2 Airport Station fare gate entrances facing Logan Airport only. Station activity is not limited to only Airport-related passengers.
3 Boardings at Logan Airport. Silver Line boardings have not been available since 2013.

Massport has a goal to double Logan Express ridership from 2 million to 4 million passengers, by the time Logan Airport reaches 50 million passengers, thereby reducing VMT, congestion, and air quality emissions. At suburban locations, Massport proposes the following action plan:

- Increase Braintree Logan Express service from two to three trips per hour (implemented in May 2019 but reduced to hourly service in March 2020 due to the impacts of COVID-19).
- Add about 1,000 additional spaces to the Framingham garage (permitting completed in 2020 however construction is deferred).
- Provide security line priority status to Logan Express Back Bay riders (implemented in 2019; this service is temporarily suspended due to COVID-19).
- Marketing to support Logan Express strategy and increase ridership.
- Implement Logan Express electronic ticketing (pending).
- Evaluate new Logan Express suburban locations, with a plan to open at least one new site (deferred due to COVID-19).
- Explore RideApp Last Mile connections.
- Continue to monitor parking capacity at all Logan Express sites.

Massport has provided Logan Express service from Woburn for many years, however in early December 2020, this service was suspended. Roughly 90 percent of the users were Logan Airport employees who will now be accommodated on-Airport.

Until March 2020, the Back Bay Logan Express operates daily trips between the hours of 5:00 AM and 10:00 PM. One-way fares in 2017 were $7.50 per passenger. Riders with a current, valid MBTA pass received reduced $3 fare. Massport recently implemented a number of improvements to the service with a focus on boosting urban Logan Express ridership and is considering the following additional services:

- Change pick-up/drop-off location from Copley to Back Bay Station (implemented in 2019);
- Discount one-way fare from $7.50 to $3.00 (implemented in 2019);
- Provide free service from Logan Airport (implemented in early 2019);
- Pilot priority security line status for riders (implemented in 2019);
- Marketing campaign to support increased ridership (ongoing);
- Implement Logan Express electronic ticketing (pending); and
- Implement a second urban Logan Express service at North Station. (Although Massport procured buses for this service in 2020, due to COVID-19, this new service has been deferred.)

The service enhancements implemented at Back Bay reversed the downtrend in ridership at this location, however, this service is currently on-hold due to the drop in ridership.

Rapid Transit

Table 5-3, previously shown, compares 2018 and 2019 ridership on rapid transit to prior years. Almost 15 percent of passengers with trip origins in Boston, Cambridge, Brookline, and Somerville used MBTA public transit to travel to the Airport via the Blue Line or Silver Line. Both services are important for reducing automobile travel to the Airport; as survey results show, over three quarters of users of the Blue Line and Silver Line indicated that their alternative mode of travel to Logan Airport would have been a taxi or RideApp, or that they would have been dropped off at the Airport by private vehicle. **Figure 5-4** illustrates the public transportation options to access Logan Airport.

The data indicate that overall ridership on the Blue Line has increased by 4.4 percent between 2017 and 2018. There was a significant decrease of 29 percent in Blue Line fare gate activity between 2018 and 2019. As noted in previous reports, fare gate data do not distinguish between Airport related riders and East Boston users, nor do they distinguish between Logan Airport air passengers and employees. Therefore, Airport passenger ridership levels on the Blue Line cannot be directly identified.[5] However, the decline in Blue Line activity may be related to the significant increase in Back Bay Logan Express ridership and continuing growth in RideApp activity given that the Blue Line ridership catchment area overlaps with both the Back Bay Logan Express and general RideApp catchment areas.

On the Silver Line, bus service from Logan Airport is free and has eliminated the need for fareboxes; thus, 2018 and 2019 figures of passenger boardings are not available. Transfers between the Silver Line and the Red Line at South Station are free. Eliminating fare collection allows all three doors to be used for boarding, thus improving Logan Airport's curb operations and schedule adherence, and reducing idling.

In 2018, Massport funded mid-life rebuilds of four additional Silver Line buses (four buses were also rebuilt in 2017). The mid-life rebuild extends the useful life of each vehicle by approximately eight years. This will allow the MBTA to maintain reliability and quality of operations along the Silver Line today while initiating the procurement process to acquire new vehicles in the future. Eight Silver Line buses were purchased in 2005 by Massport and are operated by the MBTA, with Massport paying operating costs. Since the existing Silver Line fleet is reaching the end of its useable life, the MBTA and Massport have been working together on a plan to procure a replacement Silver Line fleet. As part of this initiative, Massport and the MBTA developed a *Silver Line Capacity Study* to determine the mid-term fleet and facility needs as well as to assess other ways to improve the reliability and capacity of the system. Based on this analysis, the MBTA plans to procure 45 new enhanced electric hybrid vehicles to replace the existing fleet of 32 dual mode vehicles. Massport plans to purchase eight MBTA Silver Line buses as part of a forthcoming MBTA procurement.

5 Based on automated fare gate entrance counts, approximately 50 percent of entrances occur via the Bremen Street Park fare gates at Airport Station. Based on Massport curbside observations, approximately 45 percent of Airport Station entrances are attributable to Airport users.

FIGURE 5-3 **Logan Express Bus Service Locations, Routes, and 2018/2019 Ridership**

2018/2019 Environmental Data Report

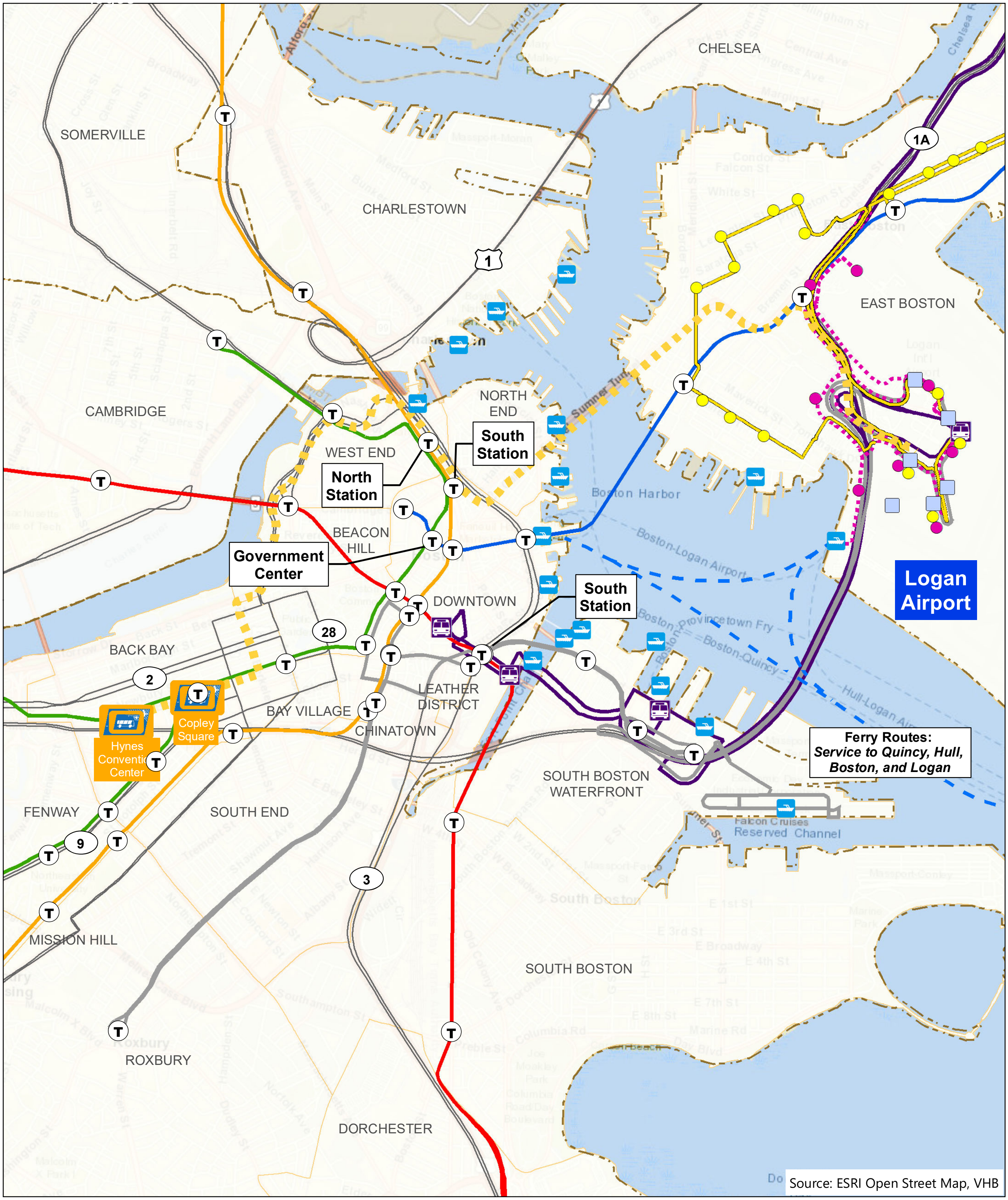


FIGURE 5-4 Public Transportation Options

Water Transportation

Table 5-3 above compares 2018 and 2019 ridership on water transportation to prior years. Three companies provide water transportation within the Boston area: Boston Harbor Cruises Water Taxi, Rowes Wharf Water Taxi, and MBTA Harbor Express. Collectively, these companies serve numerous destinations throughout the Boston Inner Harbor. The water taxi landing locations include: Long, Rowes, and Central wharfs in downtown Boston; the World Trade Center and the Moakley Courthouse in South Boston; and stops in the North End, Charlestown, Chelsea, and East Boston. A new stop opened in 2019 at Lovejoy Wharf near North Station. The MBTA Harbor Express provides services to Long Wharf and destinations outside of the Inner Harbor, including Hingham and Hull.[6] The water transportation services stop at the Logan Airport dock on Harborside Drive. Massport provides a courtesy shuttle bus service between the Logan Airport dock, the MBTA Airport Station, and all Airport terminals. Massport also provides its employees with a subsidy for water transportation modes. In 2019, Massport negotiated additional employee hours for subsidized water taxi use. Currently, the one-way fare to Logan Airport is $9.75 from Long Wharf and from Hingham/Hull. As of this filing, private and MBTA water shuttle services are suspended due to the pandemic.

Other HOV Modes: Scheduled Buses, Shared-Ride Vans, Courtesy Vehicles, and Black Car Limousines

Massport provides priority, designated curb areas at all Airport terminals to support the use of HOV and transit modes, including privately-operated scheduled buses and shared-ride vans and black car limousine services. The majority of scheduled shared-ride carriers use a combination of 15- to 40-passenger vehicles and 40+ passenger coach buses. Scheduled express bus service is offered by several privately-operated carriers from outlying areas of the Boston metropolitan area and neighboring states. Courtesy vehicle services include services between Logan Airport and many hotels in the Greater Boston area. Shared-ride vans also provide service from central and western Massachusetts and other regional points throughout New England.

As shown in **Table 5-4**, the estimated total number of seats provided by these HOV modes decreased by about 4.4 percent in 2018 compared to 2017; and further decreased by 4.9 percent in 2019 compared to 2018. The increased use of RideApps over the past few years has reduced the number of scheduled vans and black car limousines used for Airport transportation.

6 The MBTA ferry from Hingham/Hull to the Logan Airport Ferry Dock runs less frequently and is less consistent than Blue Line and Silver Line services throughout the day. Frequencies between ferries range from one hour to several hours. There are 14 MBTA ferries to and from Logan Airport on weekdays; however, there are no MBTA ferries direct to Logan Airport from the South Shore during morning commuting times.

Table 5-4 Other Scheduled and Unscheduled HOV Modes: Scheduled Buses, Shared-Ride Vans, Courtesy Vehicles, and Black Car Limousines, 2011, 2017–2019

	Estimated Seats			
Year	**Scheduled Buses**	**Scheduled Vans & Limousines**	**Courtesy Vehicles**	**Limousines (unscheduled)**
2011	2,251,480	996,208	1,885,575	1,991,672
2017	2,969,395	385,221	3,057,645	2,528,057
2018	**2,856,260**	**325,032**	**3,235,875**	**2,133,060**
2019	**2,752,970**	**297,631**	**3,125,865**	**1,953,236**
Percent Change (2017 - 2018)	**(3.8%)**	**(15.6%)**	**5.8%**	**(15.6%)**
Percent Change (2018 - 2019)	**(3.6%)**	**(8.4%)**	**(3.4%)**	**(8.4%)**

Source: Massport.
Notes: Numbers in parentheses ( ) represent a decrease in annual seats.

Pedestrian Facilities and Bicycle Parking

Massport provides a significant Airport-wide pedestrian network that links the terminals as well as linking Logan Airport to the neighboring community. Sidewalks along Harborside Drive and Hotel Drive connect to the terminals, where a series of overhead, enclosed walkways provide pedestrian access to the Central and West Parking garages as well as to and from the Hilton Hotel. The sidewalks along Harborside Drive, Transportation Way, North Service Road, and the Harborwalk facilitate pedestrian access to the Airport water shuttle boat dock, MBTA Blue Line Airport Station, and the pedestrian and bicycle pathways at Memorial Stadium Park, Bremen Street Park, and the East Boston Greenway.

Bicycle parking racks are provided at many landside facilities. Generally, these racks are expected to primarily serve employees but are open for use by air passengers as well. Terminal A, Terminal E, the Logan Office Center, Signature General Aviation Terminal, the Economy Parking Garage, the Green Bus Depot, and the Airport MBTA Station all have bicycle racks. The Rental Car Center has sheltered bicycle parking racks for use by both employees and passengers. Shower and changing facilities are provided at the Logan Office Center for employees.

Non-HOV Modes

Logan Airport passengers can access the Airport by a number of automobile modes, including private automobiles, taxis, RideApps, and rental cars. Although these modes have been historically categorized as non-HOV, they frequently carry more than one passenger per vehicle.

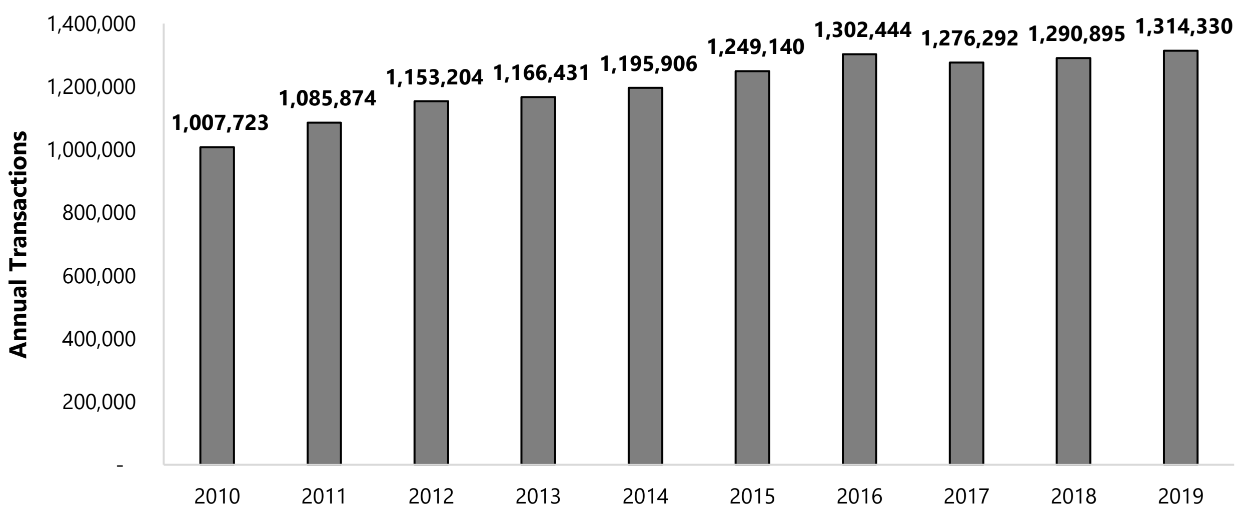
Automobile Access

Private automobile access to the Airport is classified as either curbside drop-off or parked-on-Airport (terminal area or remote/Economy). Volumes and VMT associated with these trips are described in this chapter's section on traffic conditions.

Rental Cars

Eleven rental car brands served Logan Airport in 2018 and 2019: Advantage, Alamo, Avis, Budget, Dollar, Enterprise, Hertz, National, Thrifty, Payless, and Firefly. Zipcar also provides services from the rental car facility. Although a slight decrease was noted in 2017, rental car transactions (see **Figure 5-5**) have been increasing in recent years, following the trend of increasing air passenger activity.

Figure 5-5 Annual Rental Car Transactions at Logan Airport, 2010–2019



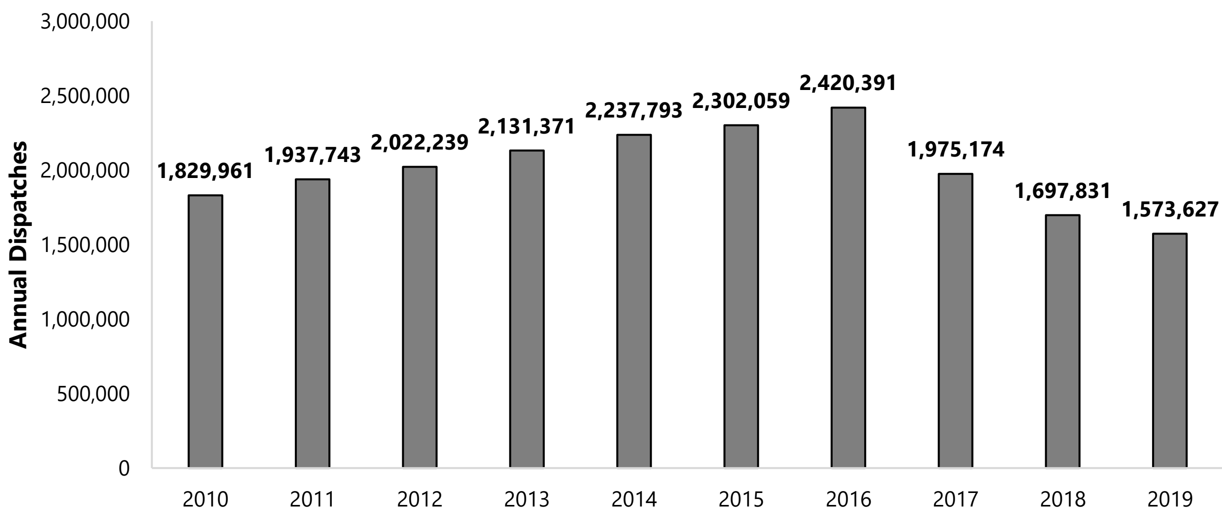
Source: Massport.

Taxis and RideApps

Taxi ridership trends are reflected in the total number of taxis dispatched from Logan Airport (serving outbound passengers). The number of taxis dispatched continue to decline, following a year-over-year trend which started in 2017 (see **Figure 5-6**) and may be attributed to an increase in RideApp operations at the Airport. COVID-19 has had an impact on Taxi ridership, resulting in a drop of approximately 94 percent in October 2020 compared to the previous year.

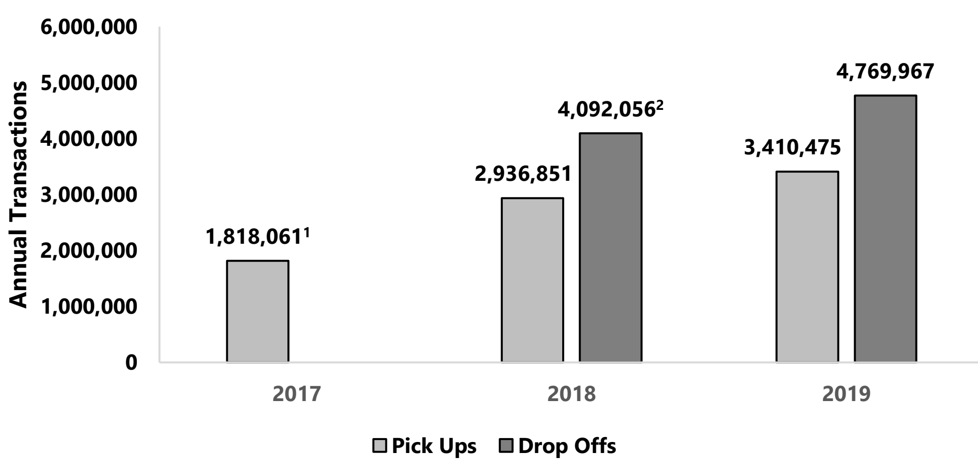
Figure 5-7 presents RideApp transaction data for 2017 through 2019. Pick-ups have grown steadily since the service was initially authorized in 2017, approximately 16 percent between 2018 and 2019. Drop offs also increased from 2018 to 2019 by approximately 17 percent. To address congestion issues caused by RideApps, Massport reconstructed the ground floor of the Central/West garage to facilitate passenger drop-off (between the hours of 10:00 AM and midnight) and pick-up (all times). This service change was completed in December 2019. As with other for-hire modes, COVID-19 has had an impact on RideApp activity, resulting in a drop of approximately 85 percent in October 2020 compared to the previous year.

Figure 5-6 Annual Taxi Dispatches at Logan Airport, 2010-2019



Source: Massport.

Figure 5-7 Annual RideApp Transactions at Logan Airport, 2017-2019



Source: Massport.
Notes:
1 Does not include January 2017.
2 RideApp drop off was first authorized at Logan Airport in 2018.

Clean Air Cab Program

Since 2007, Massport sponsored a "Head-of-Line" hybrid vehicle taxi incentive program, in partnership with the City of Boston. Under this program, Boston taxis that qualify as clean-fuel vehicles may obtain permission to move up in the line at Logan Airport's taxi pool; this allows these vehicles to be dispatched to the terminals in a shorter amount of time.

2018 and 2019 Parking Conditions

Massport manages the on-Airport parking supply at Logan Airport to promote long-term rather than short-term parking (thus reducing the number of daily trips to Logan Airport); support efficient use of parking facilities; provide good customer service; and comply with the provisions of the Logan Airport Parking Freeze. Logan Airport contains multiple parking facilities, including the Central Parking Garage (convenient access to Terminals A, B, C, and E), Terminal B Garage, Terminal E Parking Lots, and Economy Garage (free shuttle bus service to and from the terminals 24 hours a day). Details on 2018 and 2019 parking conditions are presented in the following sections.

Massport has a comprehensive parking monitoring and management program including tracking of:

- On-Airport parking conditions, including parking facilities and supply, demand, and parking rates; and
- Parking programs (including preferred parking for hybrid vehicles and electric car charging stations).

Logan Airport Parking Freeze and On-Airport Parking Availability

The number of commercial and employee parking spaces allowed at Logan Airport is regulated by the Logan Airport Parking Freeze (310 Code of Massachusetts Regulations 7.30), which is an element of the Massachusetts State Implementation Plan (SIP) under the Federal Clean Air Act (42 U.S.C. §7401 et seq. [1970]). As required, Massport submits semi-annual filings to the Massachusetts Department of Environmental Protection (MassDEP) demonstrating Massport's compliance with the Logan Airport Parking Freeze. The full reports for March and September 2018 and 2019 are provided in Appendix G, *Ground Access to and from Logan Airport*. All reports (September 2012 through March 2020) are available online. Total in-service commercial spaces are illustrated in **Figure 5-8**, along with the total number of parking spaces permitted on-Airport and the allocation of those spaces between commercial and employee spaces through 2019. Construction on the Airport and shifting of total spaces from one area to another (as discussed further below) account for the fluctuation of in-service spaces from year to year.

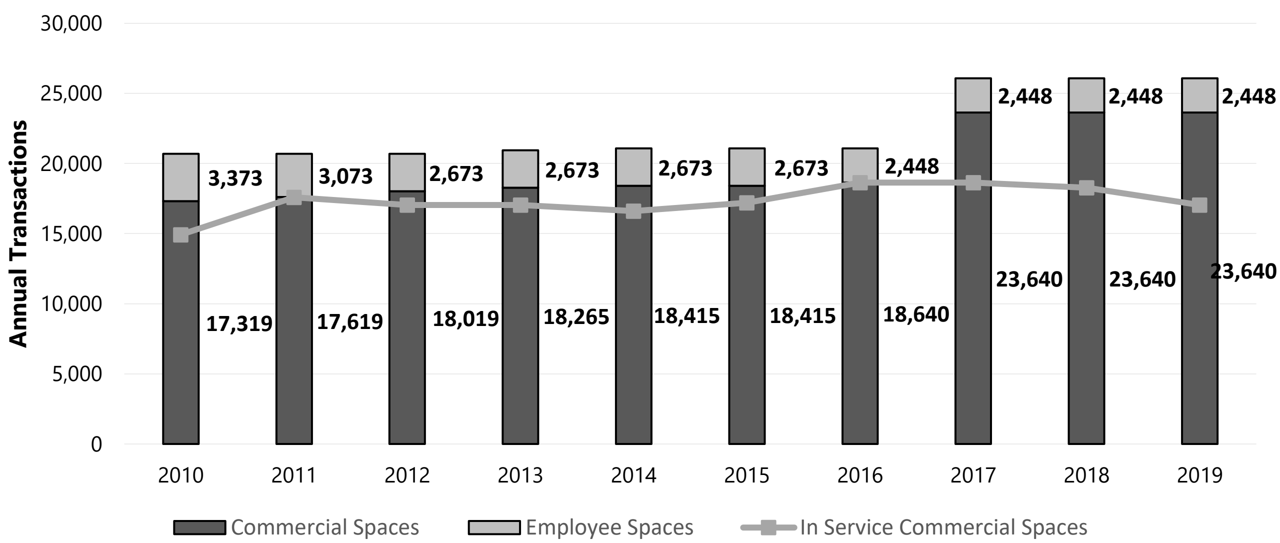
The Logan Airport Parking Freeze sets an upper limit to the supply of commercial and employee parking spaces at Logan Airport. As permitted (and encouraged) by the Parking Freeze provisions, Massport has converted employee spaces to commercial spaces, within the overall limit imposed by the Logan Airport Parking Freeze. Massport has also transferred Airport-related park-and-fly spaces managed under the East Boston Parking Freeze[7] to be managed under the Logan Airport Parking Freeze.

7 310 Code of Massachusetts Regulations 7.31.

On December 5, 2017, the U.S. Environmental Protection Agency (EPA) proposed a rule approving the revision of the Massachusetts SIP incorporating the amended Logan Airport Parking Freeze. The final rule was issued on March 6, 2018 and became effective on April 5, 2018. Initiation of concept design for the facilities needed to provide 5,000 additional commercial spaces and preparation of a Draft Environmental Impact Report (EIR)/Environmental Assessment (EA) began in 2018. The Draft EIR/EA, published in May 2019, provides additional details on the planned construction of 2,000 spaces in a new garage in front of Terminal E and an expansion of the Economy Garage with the addition of 3,000 spaces. Massport received the Final Environmental Impact Report (FEIR) certificate from the Executive Office of Energy and Environmental Affairs (EEA) on January 30, 2020, completing the permitting process. See Chapter 3, *Airport Planning*, for additional information on this project.

Under the Logan Airport Parking Freeze regulation, Massport must monitor the number of commercial and employee vehicles parked on-Airport and ensure that the total number of parked commercial and employee vehicles does not exceed the Parking Freeze limits. If the number of commercially parked vehicles exceeds the allocated commercial parking limit under the Parking Freeze on any day, those additional vehicles are considered to be using "Restricted Use Parking Spaces." Use of Restricted Use Parking Spaces is allowed under the regulation when Logan Airport experiences "extreme peaks of air travel and corresponding demand for parking spaces" and may be made available for use only at such times, up to ten days in any calendar year. These spaces must be provided free of charge when demand exceeds the limit.

Figure 5-8 Allocation of On-Airport Parking Spaces



Source: Massport.

1 In 2011, 700 employee spaces were converted to commercial spaces under the Logan Airport Parking Freeze.

2 In July 2012 and June 2013, Massport acquired property in East Boston that reallocated 396 park-and-fly spaces from the East Boston Parking Freeze area to the Logan Airport Parking Freeze area.

3 In 2016, Massport opened the West Garage Expansion, reallocating 225 employee spaces to commercial and increasing the total number of in-service spaces.

4 In 2017, MassDEP approved an additional 5,000 parking spaces.

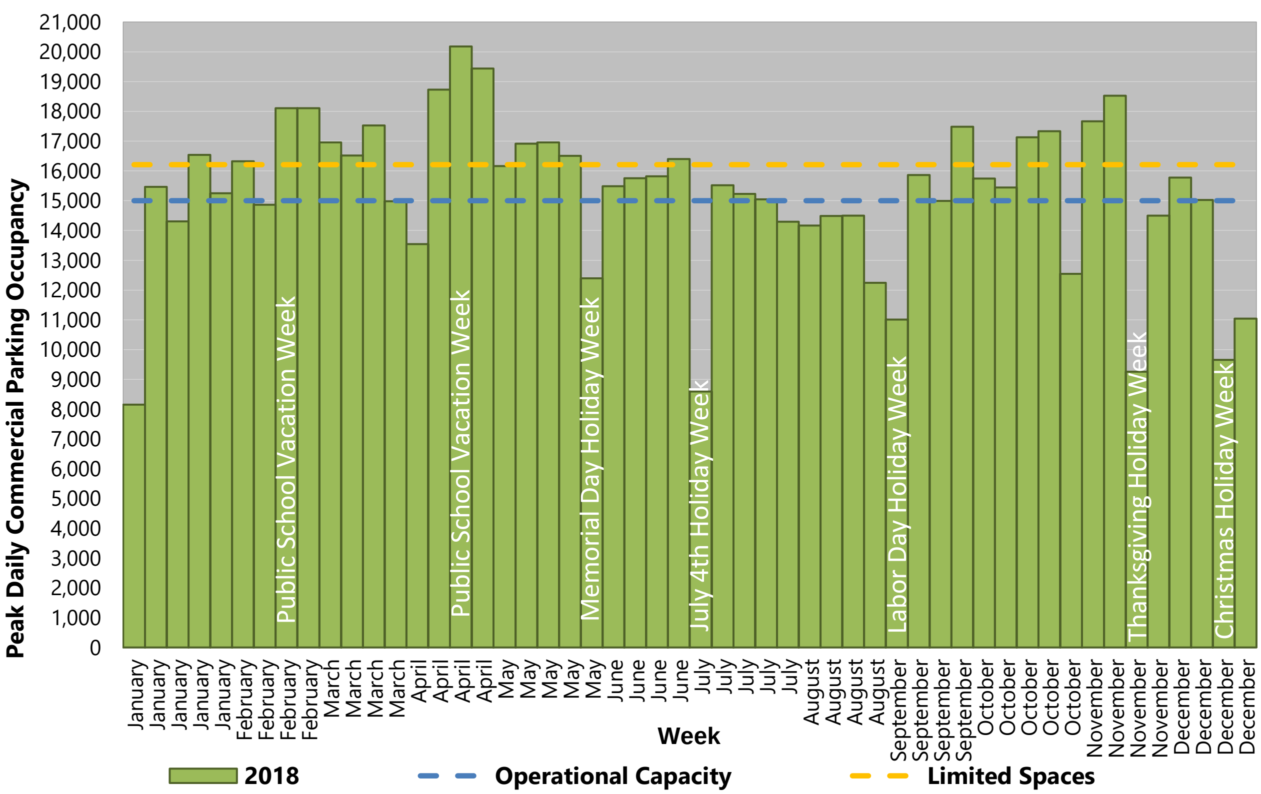
Daily Parking Occupancy

On-Airport commercial parking occupancy typically peaks mid-week (Tuesday through Thursday) with lower occupancies occurring Friday through Monday. The number of vehicles parked at Logan Airport in commercial spaces over the course of any 24-hour period was obtained from parked vehicle count data for Tuesdays, Wednesdays, and Thursdays, which are collected throughout the year. The peak daily parking occupancy data are presented in **Figure 5-9** and **Figure 5-10** for 2018 and 2019, respectively.

Peak day demand for on-Airport parking remains high, resulting in daily demand frequently nearing the previous Logan Airport Parking Freeze limits (see **Figures 5-9, 5-10, and 5-11**). Massport continued to be in full compliance with the Logan Airport Parking Freeze,[8] in 2018 and 2019 it was forced to divert vehicles to overflow lots or valet-park passenger vehicles on 47 and 69 out of 260 working days, respectively, lower than the 81 days experienced in 2017. Vehicle diversions primarily occurred on Tuesdays and Wednesdays during hours of peak parking demand.

COVID-19 has had an impact on Airport commercial parking activity. Parking exits were approximately 81 percent lower in October 2020 compared to October 2019.

Figure 5-9 Commercial Parking: Weekly Peak Daily Occupancy, 2018



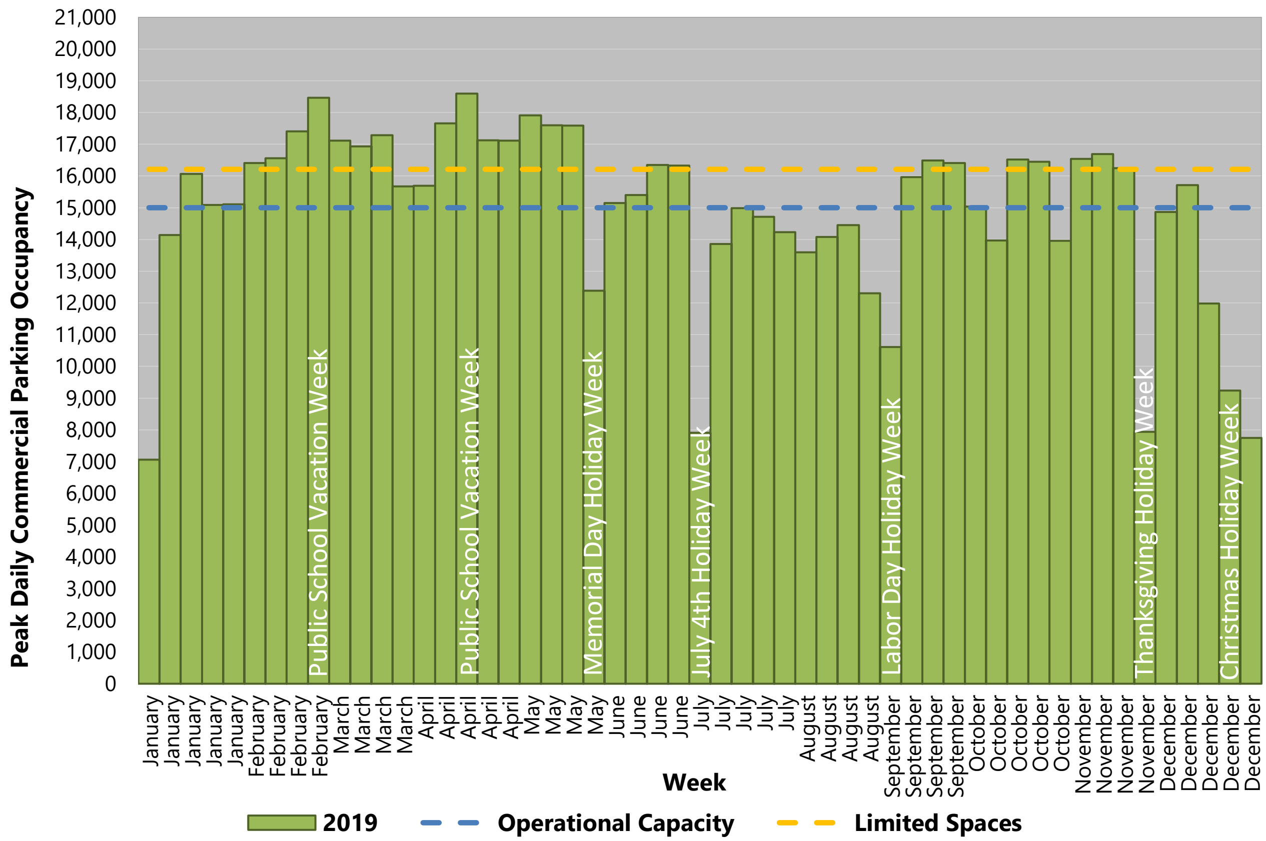
Source: Massport.

Notes: The chart shows the highest daily count for each week in 2018.

At no time in 2018 did the Parking Freeze limit on Restricted Use Spaces exceed the allowed 10 days. Massport was at all times in full compliance with the Parking Freeze regulations in 2018.

8 310 Code of Massachusetts Regulations 7.30 and 40 Code of Federal Regulations 52.1120.

Figure 5-10 Commercial Parking: Weekly Peak Daily Occupancy, 2019

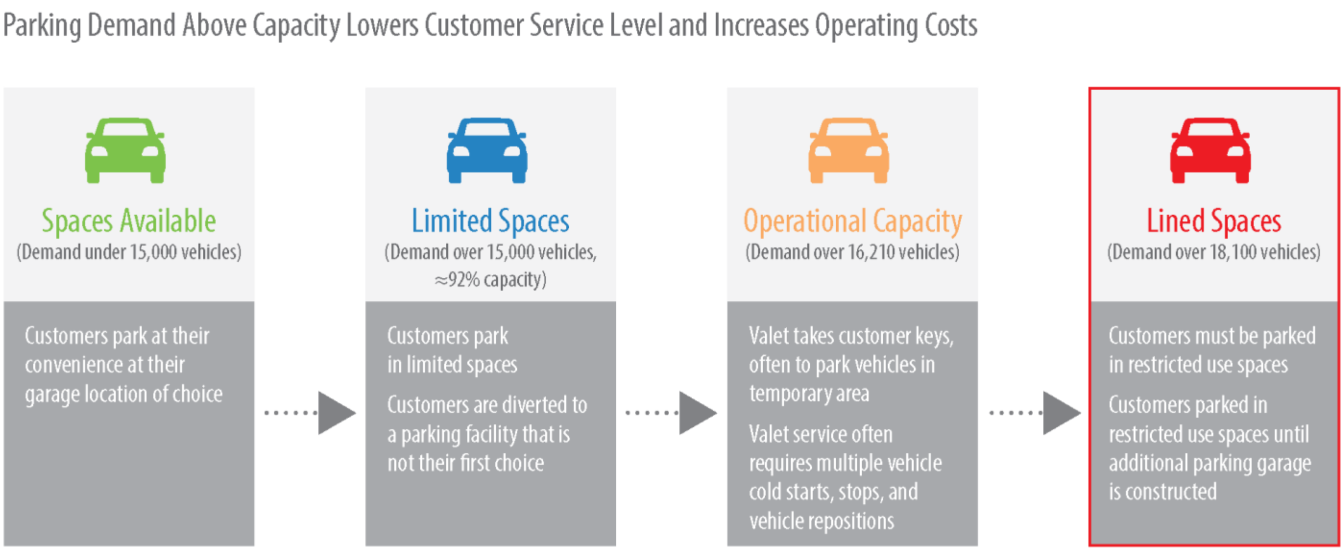


Source: Massport.
Notes: The chart shows the highest daily count for each week in 2019.
At no time in 2019 did the Parking Freeze limit on Restricted Use Spaces exceed the allowed 10 days. Massport was at all times in full compliance with the Parking Freeze regulations in 2019.

Operational Adjustments to Meet Parking Demand

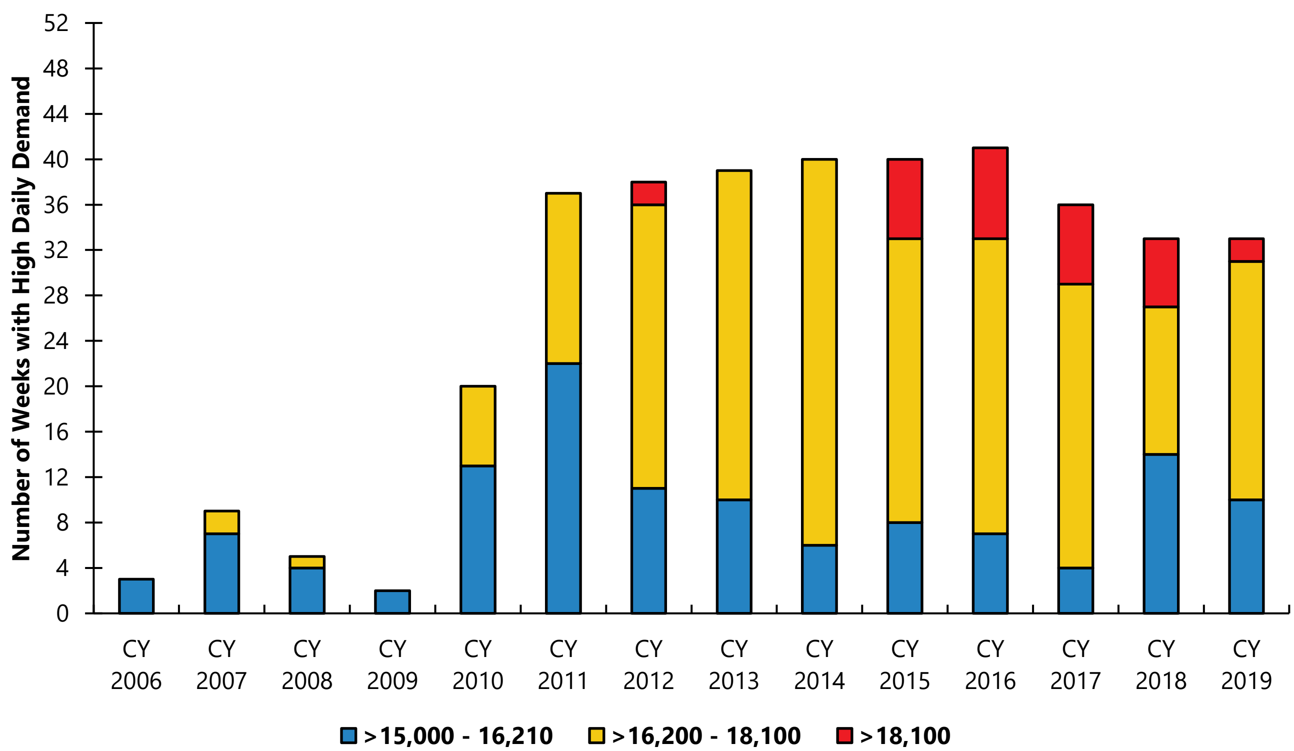
Diversions and valeting have become a regular occurrence at Logan Airport. The inadequate supply of parking causes air passengers to circulate on Airport roadways to find parking. These diversions decrease operational efficiency and compromise customer service; as well as increase on-Airport VMT by generating additional on-Airport trips that would otherwise be unnecessary under uncongested conditions. As shown in **Figure 5-12**, the number of weeks with high demand fell slightly in 2018 and held in 2019. In 2019, there were fewer weeks where the demand exceeds the lined spaces than in the previous year but more weeks where the Airport functioned at its operational capacity.

Figure 5-11 Demand for Parking: Number of Weeks per Calendar Year with High Daily Parking Demand



Source: Massport.

Figure 5-12 2018 and 2019 Parking Demand and Capacity



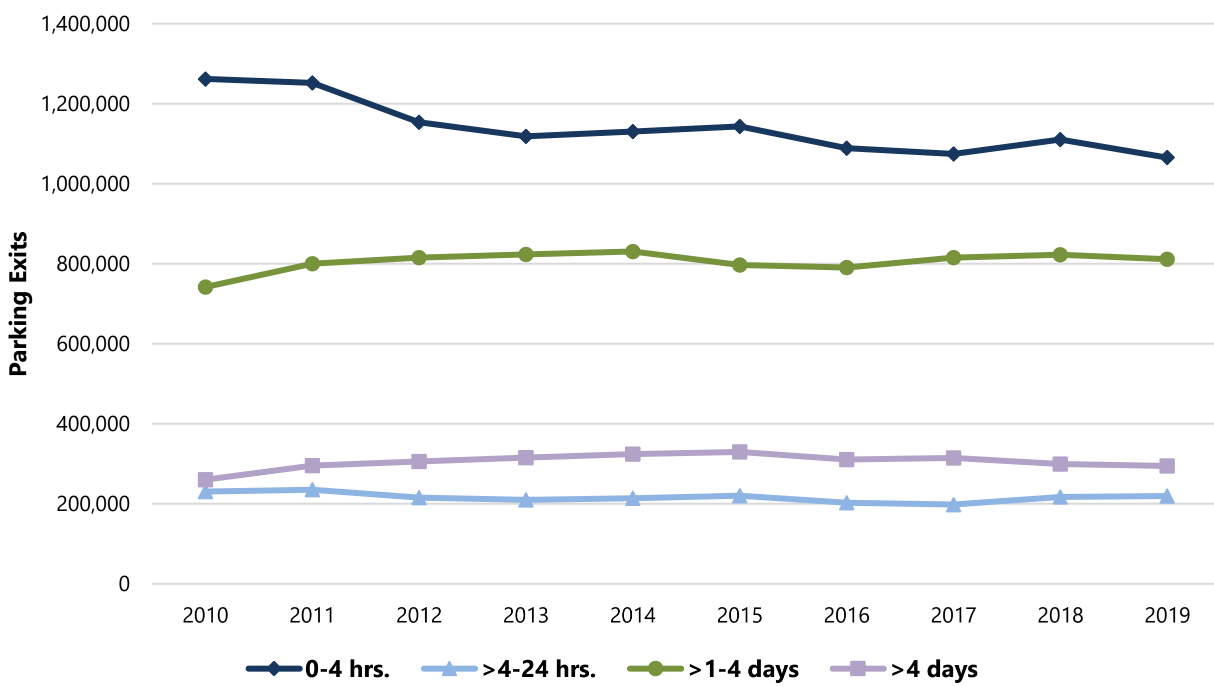
Source: Massport.

Notes: 18,100 represents the total number of lined on-Airport parking spaces allocated in 2018 and 2019. Hotel and general aviation uses, which are included in the Parking Freeze Limit, are excluded from this figure. Current commercial Parking Freeze limit is 23,640.

Parking Exits by Duration

As presented in **Figure 5-13**, the total annual parking activity (as defined by revenue parking exits) remained relatively constant through 2018 and 2019. While short-term parking has been trending down since 2010, all other parking durations have remained relatively constant, despite unprecedented growth in air passengers. Between 2017 and 2018, parking exits increased by 2.0 percent; however, between 2018 and 2019, parking exits decreased by 2.4 percent. Short-term parking (0-4 hours), followed a similar pattern as overall parking exits increasing by 3.3 percent (between 2017 and 2018) and decreasing by 4.1 percent (between 2017 and 2018). Coupled with the increase in the number of total vehicles entering the Airport may be a symptom of a shift to RideApp drop-off/pick-up modes.

Figure 5-13 Parking Exits by Length of Stay (Parking Duration)



Source: Massport.
Notes: Tickets are representative of revenue parking exits. Previous data reported in 2015 and 2016 have been adjusted down to account for the unintentional inclusion of non-revenue exits.

2019 Commercial Parking Rates

Massport periodically assesses its parking rate structure to support its ground-access strategy. As detailed in **Table 5-5**, parking rates in the on-Airport garages were increased in July 2019, while the lower parking rates for Logan Express remote parking have been maintained at $7 per day. These policies contributed to growth in Logan Express suburban park-and-ride ridership by 6.8 percent from 2017 to 2018 and 7.8 percent from 2018 to 2019.

With a pay-on-foot system, Massport requires parking fees to be pre-paid at kiosks inside the terminals and at garage access points at the pedestrian walkways, thus improving parking exit flow and reducing vehicle idling and associated emissions at exit plazas. Pay stations are located in the terminals, at the Massport shuttle drop-off/pick-up location in the Economy Garage and at the pedestrian entrances to the Central Garage, Terminal B garage, and Terminal E parking lot. Approximately 80 percent of parking patrons use the pay-on-foot system to pre-pay their parking fees before exiting.

Table 5-5 On-Airport Commercial Parking Rates, 2017 versus 2019

	Central Parking, Terminal B Garage, Terminal E Lot Rates		Economy Rates	
	2017	**2019**	**2017**	**2019**
0 minutes to 1 hour	$7	$8	$7	$8
1 to 2 hours	$19	$21	$18	$20
2 to 3 hours	$24	$26	$20	$22
3 to 4 hours	$28	$30	$23	$25
4 to 7 hours	$32	$34	N/A	N/A
7 to 24 hours	$35	$38	N/A	N/A
4 to 24 hours	N/A	N/A	$26	$29
Additional days 0 to 6 hours	$18	$19	$13	$15
Additional days 6 to 24 hours	$35	$38	$26	$29

Source: Massport.
Note: Most recent rates effective 2019.

Parking Programs and Initiatives

Massport has established the following programs and initiatives to support all Logan Airport users, including those picking up travelers who may have time to spare, those traveling to Logan Airport frequently, and those who are driving in environmentally friendly vehicles.

Cell Phone Waiting Lot

The cell phone waiting lot near Terminal E provides 61 parking spaces where drivers waiting for passengers on arriving flights may park. Before the creation of the cell phone waiting lot, drivers who were waiting for arriving passengers either used short-term parking, circulated around the Airport, or dwelled at the curb until asked to move. This facility reduces vehicle emissions by minimizing idling and on-Airport VMT by such motorists. The maximum wait time permitted at this parking lot is 30 minutes, and parking is free of charge.

Parking PASSport and Parking PASSport Gold

Parking PASSport allows users to enter and exit Logan Airport's parking garages and lots with an access card that is linked to an established account for faster payment transactions. Parking fees are automatically charged to a registered credit card and the receipt is emailed to the account holder. Customers in the Parking PASSport programs account for approximately 5 percent of parking exits at Logan Airport. Parking PASSport Gold eliminates the need for a motorist to circle the garage looking for available spaces by reserving about 8 percent of spaces in the Central/West Garage and 12 percent of spaces in the Terminal B Garage for customers enrolled in the program. First implemented in 2006, the Parking PASSport Gold program subscribers declined the last two years from 10,686 at the end of 2017 to 10,594 in December 2018 and 10,466 in December 2019.

Hybrid and Alternative Fuel Vehicle (AFV) Parking

Massport provides 173 hybrid, electric, and AFV only on-Airport parking spaces spread out among the Terminal and Economy Garage in preferred parking locations. Twenty-six of these spaces provide electric charging locations convenient to the terminals. While normal parking rates apply, there is no cost for electricity use. Real-time availability of spaces can be found on Massport's website. Currently, there are 101 charging ports installed at Logan Airport and its Logan Express sites.

Ground Access Initiatives

Massport promotes ridership on HOV, transit, and shared-ride modes and maintains efficient transportation access and parking options in and around Logan Airport to reduce the reliance on automobile modes as a means of achieving the HOV mode share goal. Measures implemented by Massport include a blend of strategies related to pricing (incentives and disincentives), service availability, service quality, marketing, and traveler information. Because of the different demographics of Logan Airport air passenger travelers, no single measure alone will accomplish the goal.

Future Passenger HOV Mode Share Goal

In the *2017 ESPR*, Massport presented a new definition of HOV, updating the definition to include the increased knowledge and data from the rapidly changing transportation landscape since the emergence of RideApps. Starting with the 2019 air passenger ground access survey, Massport is using an updated definition of HOV that considers vehicle occupancy of taxi, black car limousine, and RideApp modes. Previously, Massport counted all taxis and RideApps as non-HOV and all black car limousines as HOV, regardless of the number of passengers transported. Under the updated definition, taxis, black car limousines, and RideApps that carry two or more air passengers per vehicle are defined as HOV. With this new definition, Massport has committed to a goal of 35.5 percent HOV by 2022 and 40 percent HOV by 2027. Based on the results of the 2019 Air Passenger Ground Access Survey, HOV mode share has reached 40.4 percent, exceeding both near-term and longer-term goals. COVID-19 has had a range of impacts on ground transportation, particularly on the use of ground access HOV modes. While it's anticipated that the HOV mode share will drop as a result of COVID-19 over the short term, Massport expects HOV ridership to recover over time and remains committed to the HOV mode share goals going forward.

Logan Airport Air Passenger Ground-Access Survey

Massport periodically[9] administers an extensive survey of air passengers to better understand the ground-access characteristics of air passengers traveling to and from Logan Airport and to track historical trends of these attributes. Since the late 1970s, the *Logan Airport Air Passenger Ground-Access Survey* has been Massport's primary tool for understanding the changes in air passenger travel behavior, including ground-access mode choices, travel patterns, and market characteristics. The survey is a tool that assists Massport in evaluating the effectiveness of its transportation policies and services, and the impacts on the regional transportation system. The survey also shapes the direction of Massport's planning efforts to encourage Logan Airport travelers to use HOV transit/shared-ride modes instead of single-occupancy vehicle (SOV) modes.

The survey is the principal means of measuring air passenger ground-access HOV mode share. **Table 5-6** presents the air passenger ground access mode shares from the 2019 survey findings. Additional findings from the *2019 Logan Airport Air Passenger Ground Access Survey* that relate to mode choice are presented in this section, as are comparisons of the results to past surveys.

Progress toward the future air passenger mode share goal is measured using the air passenger ground-access survey. The latest survey revealed an air passenger ground access mode share of 40.4 percent for HOV and shared-ride modes, using the updated definition of HOV presented in the previous section. The result confirms Logan Airport to be at the top of U.S. airports with respect to HOV and shared-ride mode share.[10]

9 Since 2004, a survey has been administered every three years.

10 There is no standard aviation industry definition with respect to categorizing ground access modes as HOV versus single occupancy vehicle (SOV). While some modes (e.g., Logan Express and the Silver Line) clearly fall into the HOV mode category, the appropriate category for a black car limousine or taxi is less clear.

Traveling in a private vehicle and being dropped-off at the Terminal Area is still the predominant way that air passengers get to Logan Airport; this mode is used by 21.3 percent of travelers. The use of RideApps[11] (such as Uber/Lyft/Fasten) to access the Airport is the second most common mode, at a 14.3-percent share. The combined mode shares for transit modes (including the MBTA's services, Logan Express, and similar scheduled bus services) is approximately 16.3 percent of air passengers traveling to the Airport. Driving and parking at the Airport is the mode used by 11.4 percent of air passengers and taxis are now used by 9.8 percent.

Table 5-7 presents these aggregated air passenger ground access mode shares for survey years 2010, 2013, 2016, and 2019. As the data indicate, RideApps rise in popularity as a ground access mode is evident from the last two surveys. RideApp use more than doubled from 2016 to 2019 and drew down mode shares from each of the other ground access modes.

11 RideApps were not legally allowed to operate for arriving passengers in 2016.

Table 5-6 Air Passenger Ground Access Mode Share, 2019

	Spring 2019 Air Passenger Survey		
Ground-Access Mode	**Weekday**	**Weekend**	**All Trips**
Automobile Modes:			
Private Vehicle			
Dropped off	19.3%	26.8%	21.2%
Parked at Terminal	8.1%	5.2%	7.3%
Parked in Economy Lot or Overflow	2.3%	1.3%	2.0%
Parked Off-Airport	1.6%	1.2%	1.5%
Rental Vehicle	9.9%	12.9%	10.7%
Taxicab (1 occupant)	2.0%	0.8%	1.7%
Uber/Lyft/Fasten (1 occupant)	15.0%	10.7%	13.9%
Car Service (black car, private limo, etc.) (1 occupant)	1.3%	0.7%	1.1%
Subtotal	**59.6%**	**59.8%**	**59.6%**
HOV/Shared Ride Modes:			
Public Transit			
Logan Express Bus	4.2%	2.8%	3.8%
Other Express Bus	4.7%	3.8%	4.5%
MBTA Blue Line Subway	1.3%	1.3%	1.3%
MBTA Silver Line Bus	2.3%	1.1%	2.0%
MBTA Commuter Rail	0.8%	0.3%	0.7%
Water Shuttle/Water Taxi	0.1%	0.0%	0.1%
Other Shared-Ride Vehicles			
Taxicab (2 or more occupants)	2.1%	2.5%	2.2%
Uber/Lyft/Fasten (2 or more occupants)	15.4%	16.0%	15.5%
Car Service (black car, private limousine, etc.) (2 or more occupants)	3.3%	2.5%	3.1%
Shared ride van or limousine	1.1%	1.0%	1.0%
Free Hotel/Courtesy Shuttle	2.4%	3.1%	2.6%
Charter Bus	1.7%	5.0%	2.6%
Other	1.0%	0.7%	0.9%
Subtotal	**40.4%**	**40.2%**	**40.4%**
Total	**100.0%**	**100.0%**	**100.0%**

Source: Spring 2019 Air Passenger Ground-Access Survey.

Table 5-7 Ground-Access Mode Share (All Passengers) by Survey Year

Ground-Access Mode	**2010**	**2013**	**2016**	**2019**
Private Automobile	40.4%	43.2%	34.5%	32.1%
Taxi	18.8%	18.6%	9.8%	3.9%
Rental car	10.9%	10.4%	10.9%	10.7%
RideApps	N/A	N/A	14.3%	29.5%
Unscheduled HOV	7.6%	8.3%	8.1%	7.8%
Scheduled HOV	8.2%	6.9%	9.7%	8.4%
Transit	7.6%	7.6%	6.6%	4.1%
Courtesy Shuttle	4.6%	3.3%	3.3%	2.6%
Other	1.8%	1.7%	2.6%	0.9%
Total	**100%**	**100%**	**100%**	**100%**

Source: Spring 2010, 2013, 2016, 2019 Air Passenger Ground-Access Surveys.
For this table, air passenger ground-access modes are grouped into the following categories:

- Private Automobile: Includes all passengers that are dropped-off by a privately-owned automobile, and all passengers who drive and park their vehicles at the Airport.
- Taxi: A passenger driven to Logan Airport in a licensed, commercial taxi.
- Rental Car: A passenger who rents a car from an on-Airport or nearby off-Airport rental car agency.
- RideApps include services such as Uber, Lyft, and Fasten and are captured in the 2016 survey data for the first time.
- Unscheduled HOV Service: Includes passengers who travel to Logan Airport via unscheduled limousine or van providers.
- Scheduled HOV Service: A passenger who arrives at Logan Airport via scheduled bus, limousine, or van service, including privately-operated services and Massport's Logan Express.
- Transit: A passenger who takes an MBTA public transit service (including the Blue Line subway, Silver Line bus rapid transit) or one of the water transportation services (operated in conjunction with a dedicated Massport shuttle bus to/from Logan Airport terminals).
- Courtesy Shuttle: A passenger who arrives at the Airport in a courtesy shuttle, such as those offered by nearby hotels.
- Other: Includes passengers that access the Airport by walking, riding a bicycle, taking a charter bus, or riding an MBTA bus (excluding the Silver Line).

Average Vehicle Occupancy (Air Passengers) by Ground-Access Vehicle Modes

Table 5-8 presents the average occupancy and percentage of passengers arriving in single occupant vehicles for each applicable mode. As expected, average occupancy is generally lower for the automobile modes, while the percentage of passengers arriving in SOVs is highest for these modes. Among the automobile modes, however, average occupancy is slightly higher for private vehicles than taxis and RideApps, but lower than rental cars. Occupancy is highest for other shared ride van/limousine at 3.51 persons per respondent-trip. Single occupant trips are correspondingly lowest for other shared ride van/limousine, at around 12 percent of the total. The overall average occupancy and percent SOV passengers closely mirror that of the automobile modes, reflecting their relatively high share of airport ground-access trips.

Table 5-8 Average Vehicle Occupancy for Selected Ground Access Modes: 2019

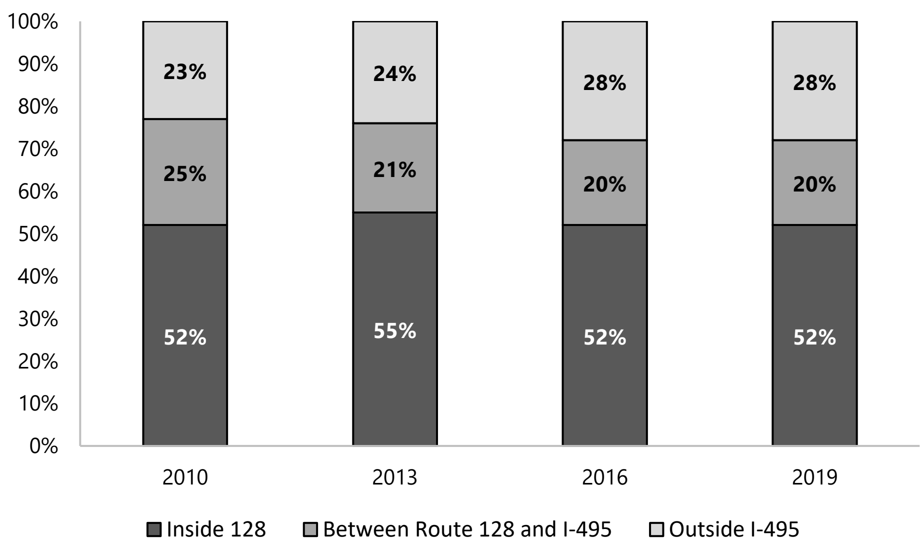
	Mode	Average Vehicle Occupancy	% Single Occupancy
Automobile	Private Vehicle	2.26	16.7%
	Rental Vehicle	2.05	26.1%
	Taxicab	1.63	44.0%
	Regular app ride	1.48	47.8%
	Premium app ride	2.01	29.9%
	Shared app ride	1.48	51.7%
	Subtotal	**1.84**	**31.3%**
HOV/Shared Ride	Car service	1.97	26.9%
	Other shared ride van/limousine	3.51	11.6%
	Subtotal	**2.20**	**23.8%**
TOTAL		**1.87**	**30.8%**

Source: Massport 2019 Air Passenger Ground Access Survey data
Note: Average Vehicle Occupancy & % Single Occupancy for each mode.

Ground-Access Origins of Air Passengers

Figure 5-14 indicates how the distribution of air passenger trips by geographic area has changed over time. The majority of trips still originate in Boston and other communities within Route 128. Nevertheless, Logan Airport draws over a quarter of its passengers from areas outside of I-495.

Figure 5-14 Logan Airport Air Passenger Ground-Access Trip Origins



Source: Spring 2010, 2013, 2016, 2019 Logan Airport Air Passenger Ground-Access Surveys.
Note: Based on air passengers departing on both weekdays and weekend days.

The origin of an air passenger ground-access trip has an important influence on mode choice. Simply stated, transportation systems and services vary by geographic area, and thus affect the travel behavior of a passenger traveling to Logan Airport. This is apparent from the results shown in **Table 5-9,** in which the distribution of ground access modes among passengers within four geographic areas is provided.

As expected, transit use is highest in the Urban Core (defined as Boston, Brookline, Cambridge, and Somerville) as this area is served by the MBTA's rapid transit system. RideApp and taxi use is also highest in this area (approximately half of all trips), due in part to the proximity to the Airport. The area outside of the Urban Core but within the Route 128 highway belt is the area with fewest HOV/transit options, and its mode share reflects this, including the highest share of private vehicle and RideApp drop-off. Outside of Route 128, scheduled express bus services provide the bulk of the HOV/shared-ride services. In fact, ridership growth in Logan Express and private buses have helped increase transit shares outside of Route 128 (but within the Commonwealth of Massachusetts) to near parity with the Urban Core. Otherwise, private vehicles are the dominant mode of access for passengers originating in areas outside of the Boston metropolitan area urban core.

Table 5-9 Ground Access Mode Share by Air Passenger Ground Trip Origin, 2019

	Ground Trip Origin				
Ground Access Mode	**Urban Core**	**Between Urban Core and Route 128**	**Between Route 128 and I-495**	**Outside I-495**	**Outside of MA**
Dropped off	11%	26%	28%	29%	19%
Parked On-Airport	3%	7%	18%	20%	16%
Parked Off-Airport	0%	1%	1%	2%	4%
Rental Vehicle	6%	14%	13%	15%	13%
Taxi	8%	3%	2%	1%	1%
RideApp	53%	38%	14%	5%	6%
Car service (black car, private limousine, etc.)	2%	3%	6%	6%	6%
Logan Express Bus	1%	1%	10%	7%	2%
Other Express Bus	0%	0%	2%	5%	22%
MBTA Silver Line Bus	4%	1%	0%	0%	0%
MBTA Blue Line Subway	4%	1%	1%	0%	1%
Water Shuttle/Water Taxi	0%	0%	0%	0%	0%
Shared ride van or limousine	0%	0%	1%	4%	2%
Free Hotel/Courtesy Shuttle	4%	3%	0%	0%	2%
Charter Bus	2%	1%	3%	5%	4%
Other	2%	0%	1%	2%	2%
Total	**100%**	**100%**	**100%**	**100%**	**100%**

Source: 2019 Logan Airport Air Passenger Ground-Access Survey.

Market Segment: Trip Purpose and Residency

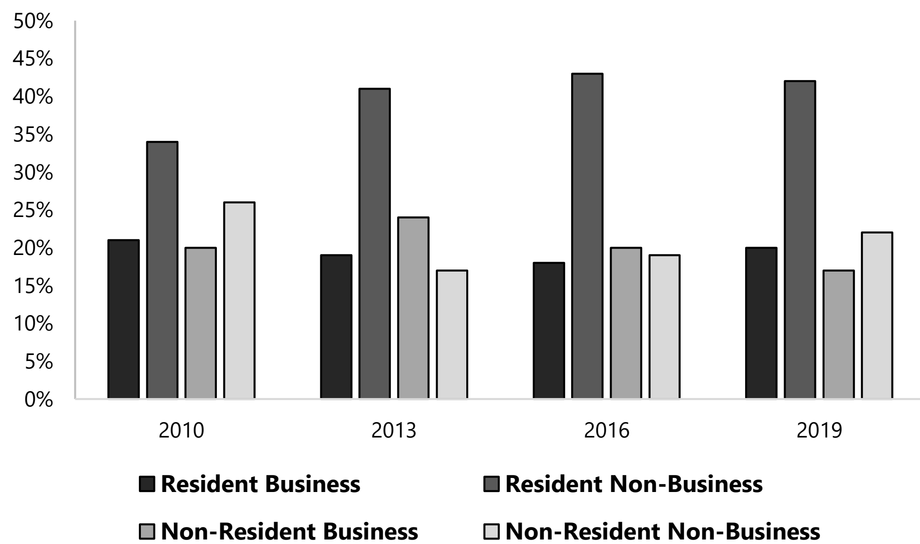
Massport characterizes air passengers into four distinct market segments:

- **Resident Business:** passengers living within the region served by Logan Airport and traveling for business reasons;
- **Resident Non-Business:** passengers living within the region served by Logan Airport and conducting personal travel (e.g., leisure trip);
- **Non-Resident Business:** passengers living outside the region served by Logan Airport and traveling to conduct business; and
- **Non-Resident Non-Business:** passengers living outside the region served by Logan Airport and traveling for personal reasons (e.g., leisure or vacation travelers).

Residents are defined as passengers who use Logan Airport as their "home" airport, regardless of their proximity to other airports. It is important to study the passenger market in this manner because sensitivity to key factors that influence travel behavior such as convenience, time reliability, and pricing varies among these passenger market segments. This information assists Massport in developing appropriate ground access services for passengers.

Figure 5-15 compares the share of weekday trips by market segment across the six most recent surveys. The resident non-business market is the largest market segment, contributing over one-third of all air passengers at Logan Airport. In general, the market share of leisure segments increased slightly in 2019 compared to 2016.

Figure 5-15 Weekday Market Segments (Combined Trip Purpose and Residency)[1]



Source: Spring 2010, 2013, 2016, 2019 Logan Airport Air Passenger Ground-Access Surveys.
1 Based on air passengers departing on weekdays only. Figures rounded.

There are numerous implications for ground access due to the changing mix of Logan Airport air passengers. **Tables 5-10** and **5-11** present ground access mode shares by market segment. HOV mode share is overall typically lower in the business market segments; business travelers typically have a high sensitivity to time, require flexibility and schedule reliability, and often make decisions related more to convenience than to cost (which is often covered by their employer not by the passenger). Public transit and scheduled HOV services (including Logan Express) have a higher share among the non-business market segments, particularly for residents that have greater familiarities with the systems. Non-business market segments are more sensitive to ground-transportation costs, travel less frequently but for longer time periods, and tend to travel at off-peak fly times/days. These factors help account for the increase in HOV and the relatively flat year-over-year changes observed in parking exits.

Table 5-10 Ground-Access Mode Share by Market Segment, 2019

	Resident Business	Resident Non-business	Non-resident Business	Non-resident Non-business
Private Automobile	44.0%	41.5%	4.5%	22.7%
Taxi	2.6%	2.1%	9.7%	4.2%
Rental Car	1.0%	1.1%	28.4%	23.7%
RideApp	33.4%	25.1%	40.2%	28.3%
Unscheduled HOV/limousine	5.1%	6.8%	4.4%	3.2%
Public and Water Transit	3.0%	4.4%	2.3%	5.7%
Scheduled Bus	7.5%	13.4%	1.5%	5.0%
Courtesy shuttle	0.3%	2.4%	4.5%	3.4%
Other	3.1%	3.2%	4.4%	3.8%

Source: *Spring 2019 Air Passenger Ground Access Survey*. Based on air passengers departing on both weekdays and weekend days. Rounded figures.

Table 5-11 Ground-Access Mode Share by Market Segment (Recent Surveys)

	Resident Business				Non-Resident Business			
Ground Access Mode	**2010**	**2013**	**2016**	**2019**	**2010**	**2013**	**2016**	**2019**
Automobile Modes								
Private Automobile	59%	62%	48%	44%	12%	14%	6%	5%
Taxi	16%	17%	9%	3%	36%	30%	21%	10%
Rental Car	<1%	<1%	2%	1%	27%	25%	29%	28%
RideApp	-	-	14%	33%	-	-	15%	40%
Subtotal Auto Modes	**76%**	**80%**	**74%**	**81%**	**75%**	**69%**	**72%**	**83%**
HOV Modes								
Unscheduled HOV	10%	9%	12%	5%	10%	12%	10%	4%
Public and Water Transit	6%	6%	3%	3%	3%	2%	4%	2%
Scheduled Bus	4%	5%	8%	8%	5%	9%	3%	2%
Courtesy shuttle	2%	1%	<1%	<1%	5%	6%	7%	5%
Other	1%	1%	2%	3%	2%	2%	4%	4%
Subtotal HOV Modes	**24%**	**20%**	**26%**	**19%**	**25%**	**31%**	**28%**	**17%**

Table 5-11 Ground-Access Mode Share by Market Segment (Recent Surveys) (Continued)

	Resident Non-Business				Non-Resident Non-Business			
Ground-Access Mode	**2010**	**2013**	**2016**	**2019**	**2010**	**2013**	**2016**	**2019**
Auto Modes								
Private Automobile	49%	55%	44%	42%	36%	33%	29%	23%
Taxi	13%	13%	5%	2%	17%	18%	10%	4%
Rental Car	2%	1%	2%	1%	18%	20%	21%	24%
RideApp	-	-	14%	25%	-	-	15%	28%
Subtotal Auto Modes	**63%**	**69%**	**65%**	**70%**	**71%**	**71%**	**75%**	**79%**
HOV Modes								
Unscheduled HOV	8%	9%	7%	7%	4%	4%	5%	3%
Public and Water Transit	12%	11%	9%	4%	8%	6%	7%	6%
Scheduled Bus	11%	7%	14%	13%	9%	11%	7%	5%
Courtesy shuttle	4%	2%	2%	2%	6%	6%	5%	3%
Other	2%	1%	2%	3%	2%	2%	1%	4%
Subtotal HOV Modes	**37%**	**30%**	**35%**	**30%**	**29%**	**29%**	**25%**	**21%**

Source: Spring 2010, 2013, 2016, 2019 Air Passenger Ground-Access Surveys.

RideApp Management Program

Massport initiated RideApp pick-up and drop-off operations in February 2017. RideApp pick-up lots were originally small employee lots that were not intended to handle thousands of daily RideApp pick-ups, contributing to a long wait time for customer and vehicles backing onto terminal-area roadways (causing congestion and delays for customers). **Table 5-12** outlines the policies that Massport is considering to manage RideApp operations and the status of each.

Table 5-12 Massport RideApp Management Plan

Policy	Goal	Status
1. Rematch and Shared Ride	■ Massport has approved changes such that RideApp passengers will be dropped off or picked up at new dedicated areas in the Central Garage through climate-controlled walkways to and from the terminals, facilitating rematch and shared ride.	■ Fully Implemented December 2019
	■ Implement RideApp rematch so drivers dropping off can more easily leave with a passenger.	■ Fully Implemented December 2019
	■ Introduce RideApp shared ride incentives to reduce RideApp vehicles through gateways by increasing vehicle occupancies.	■ Reduced fee for RideApp shared rides; Fully Implemented December 2019
2. RideApp Fee Structure	■ Adopt new RideApp fee structure to support HOV strategies, encourage shared rides, and reduce gateway congestion.	■ Reduced fee for RideApp shared rides; Fully Implemented December 2019
3. Optimize RideApp Operations On-Airport	■ Introduce RideApp data reporting, new emerging RideApp products, new enforcement tools.	■ Ongoing

Source: Massport.

Long-Term Parking Management Plan

In addition to supporting HOV, Massport actively manages parking supply as another strategy to reduce drop-off/pick-up modes. Massport manages the on-Airport parking supply at Logan Airport to: (1) promote long-term rather than short-term parking (thus reducing the number of daily trips to Logan Airport); (2) support efficient utilization of parking facilities; (3) provide good customer service; and (4) comply with the provisions of the Logan Airport Parking Freeze. Massport has reduced the number of on-Airport employee spaces from over 5,000 to 2,448 spaces to further reduce VMT and promote sustainable transportation options through a Massport-wide newsletter. The analysis and findings of the *Logan Airport Parking Freeze Amendment Ground Access and Trip Reduction Strategy Studies* can be found on the Massport website: http://www.massport.com/media/3370/final-massport-dep-report.pdf.

The Long-Term Parking Management Plan, which was first included in the *2012/2013 EDR,* lays out a multi-part strategy for efficiently managing parking supply, pricing, and operations—both at Logan Airport and at Massport-controlled off-Airport locations—to maximize HOV, transit, and shared-ride ground access while minimizing both drive-and-park and drop-off/pick-up modes. The Long-Term Parking Management Plan represents Massport's current strategy to manage parking pricing, supply, and demand within the current Logan Airport Parking Freeze.

Table 5-13 describes each parking plan element completed or proposed in the near future, and progress to date. The Long-Term Parking Management Plan sets out the efforts that Massport has undertaken, and will continue to take in the future, to manage the supply, pricing, and operation of parking.

Table 5-13 Long-Term Parking Management Plan Elements and Progress

Parking Plan Element	Progress
Parking Supply:	
▪ Add revenue-controlled parking spaces in the terminal area to bring supply up to the maximum number of spaces allowed under the Logan Airport Parking Freeze.	▪ As allowed by the amended Parking Freeze and Logan Airport Parking Project (through Massachusetts Environmental Policy Act [MEPA] permitting), Massport is permitted to add 2,000 new commercial spaces in a new garage in front of Terminal E and 3,000 additional spaces through a vertical expansion to the Economy Garage. The Parking Project has been deferred due to the reduction in passenger activity associated with the pandemic.
▪ Work to increase the supply of Massport-controlled off-Airport parking at Logan Express sites.	▪ Massport plans to add around 1,000 additional spaces to the parking garage at the Framingham site. This plan is currently deferred.
Parking Pricing:	
▪ Discourage air passengers from driving and parking at Logan Airport by ensuring that the Massport-controlled parking provided at remote Logan Express sites is the least expensive.	▪ Massport has reduced parking rates at Logan Express facilities from $11.00 per day to $7.00 per day. The least expensive parking at Logan Airport is $26.00 per day.
▪ Encourage more efficient use of available on-Airport parking by maintaining a meaningful price differential between rates at the Economy Parking Garage and terminal-area parking garages.	▪ Economy Parking is $29.00 per day in 2019; terminal-area garage and lot rates in 2019 are $38.00 per day.
▪ Evaluate increased parking prices for terminal-area parking to encourage Airport passengers and visitors to consider transit and shared-ride alternatives.	▪ Parking pricing review is ongoing.

Table 5-13 Long-Term Parking Management Plan Elements and Progress (Continued)

Parking Demand:	
▪ Increase the frequency and availability of alternative high-occupancy vehicle (HOV) mode options to decrease use of private vehicles.	▪ Massport is evaluating a number of opportunities to improve Logan Express service (specific details related to these opportunities are provided elsewhere in this chapter). ▪ Massport offers discounted parking and bus fares at all Logan Express locations during peak air travel periods. ▪ Massport placed signage in all terminals to help promote the use of the regional express bus carriers. ▪ Massport continues to sponsor free outbound (from Logan Airport) Silver Line bus service and Back Bay Logan Express service. ▪ Massport continues to work with private carriers to provide HOV options to and from Logan Airport.
Employee Parking:	
▪ Continue to work to reduce the number of Airport employees commuting by private automobile and parking at the Airport by providing off-Airport parking both near Logan Airport and at Logan Express sites and implementing measures to enhance employee commuting options.	▪ Massport provides employee parking in Chelsea with free shuttle bus transportation to the Airport. Due to the pandemic, the Chelsea Garage is now closed and employees are accommodated on-Airport. ▪ Massport offers reduced employee rates to encourage the use of Logan Express facilities. ▪ Additional early morning and late-night bus service has been added to Logan Express sites to encourage use and better serve Logan Airport employee schedules. ▪ Massport supports the Sunrise Shuttle, which provided early morning bus service for employees from East Boston and parts of Winthrop and Revere prior to the start of Massachusetts Bay Transportation Authority (MBTA) service.

Source: Massport.

Employee Ground Transportation Initiatives

Airport employee transportation has different ground access considerations than passenger transportation. Airport employees often have non-traditional (and often unpredictable) working hours that are difficult to match to typical transit service hours (MBTA service typically runs from 5:00 AM to 1:00 AM). Due to the time-sensitive nature of airline operations, on-time reliability is important for employee transportation, as is flexibility during severe weather or other delays that may extend a typical employee workday or work shift.

Massport strives to reduce the number of Airport employees commuting by private automobile, enhance commuter options, and reduce traffic and parking demands at Logan Airport. To help accomplish these objectives, Massport continues to:

- Provide off-Airport employee parking in Chelsea, which is served by frequent free shuttle bus service to the terminals (Route 77) 24 hours a day, seven days a week (due to the pandemic, the Chelsea Garage is now closed and employees are accommodated on-Airport);

- Run free employee shuttle buses between Airport Station and employment areas in the Southwest Service Area and the South Cargo Area locations (Routes 44, 66, and Logan Office Center);
- Operate early morning and late-night Logan Express bus trips for commuters;
- Support the Sunrise Shuttle for early morning bus service from East Boston, Winthrop, and Revere prior to the start of MBTA service;
- Expand and maintain a comprehensive sidewalk/walkway system on Logan Airport to facilitate pedestrian access;
- Provide employee subsidies for water transportation use;
- Provide bicycle racks;[12]
- Advise Airport employers on transit benefits and provide information on available commuting alternatives, ride-matching services, and reduced-rate HOV and transit fare options; and
- Contribute $65,000 annually to the Logan Transportation Management Association (TMA).

Ground Access Goals

Table 5-14 lists each ground access goal and updates Massport's initiatives associated with each goal. Initiatives are planned, designed, implemented, and continuously refined to account for the changing national, regional, and local conditions that affect Logan Airport and its users.

Table 5-14 Ground Access Planning Goals and Progress (2019)

Goal	2019 Update
Increase air passenger ground-access high-occupancy vehicle (HOV) mode share to 40 percent by 2027	Massport continues to provide and actively promote numerous HOV and shared-ride options to air passengers, including Logan Express bus service, the Silver Line, water shuttle services, and frequent, free shuttle bus service to and from the Massachusetts Bay Transportation Authority (MBTA) Blue Line Airport Station. Massport is investigating ways to increase HOV mode share by implementing new HOV initiatives and pricing strategies. Massport has committed to a goal of 35.5 percent HOV by 2022 and 40 percent by 2027. Massport continues its partnership with the MBTA to offer free boardings of the Silver Line bus at the Airport. The promising results of reduced dwell times and faster travel times through the terminal area led Massport to extend the free-fare program indefinitely. Eight Silver Line buses purchased by Massport are operated by the MBTA with Massport paying operating costs for the Silver Line buses. In 2018, Massport funded mid-life rebuilds of four Silver Line buses. Massport plans to purchase eight MBTA Silver Line buses as part of a forthcoming MBTA procurement. In 2019, Massport improved Back Bay Logan Express Service by changing the location of the stop at Copley to the MBTA Back Bay Station; discounting one-way fares from $7.50 to $3.00 (return fares will be free); piloting a priority security line status for riders; executing a marketing campaign to support increased ridership; and implementing Logan Express electronic ticketing. Massport is investing in existing suburban Logan Express sites by increasing the Braintree Logan Express service from two to three trips per hour.

12 Bicycle racks are provided at Terminal A, Terminal E, Logan Office Center, MBTA's Airport Station, Economy Parking Garage (covered), Signature general aviation terminal, the Green Bus Depot (Bus Maintenance Facility), and the Rental Car Center (covered).

Table 5-14 Ground Access Planning Goals and Progress (2019) (Continued)

Goal	2019 Update
Increase air passenger ground-access high-occupancy vehicle (HOV) mode share to 40 percent by 2027	Massport plans to add approximately 1,000 additional spaces to the Framingham site's garage to accommodate current and future demand. These plans are currently deferred due to the pandemic. Massport plans to offer a new urban Logan Express service at North Station in the future. This service would be free from Logan Airport and $3 to Logan Airport, and have three trips per hour. A security line priority status would be provided to North Station Logan Express riders and electronic ticketing would be implemented. This initiative is deferred due to the pandemic.
Reduce employee reliance on commuting alone by private automobile	Massport continues to support the Logan Transportation Management Association (TMA) with $65,000 annually (no dues are collected from Airport employers). Massport uses funds from the Logan TMA to operate the two early morning Sunrise Shuttle services that serve East Boston, Winthrop, and Revere. Massport continues to provide outreach to employees about commute options. For employees who reside in neighborhoods and communities closer to the Airport, bicycle parking options have increased with bicycle racks offered at Terminal A, Terminal E, the Economy Garage, the Green Bus Depot, the Rental Car Center, the Logan Office Center, and the Signature general aviation terminal. Massport is also investigating ways to improve bicycle access to/around Logan Airport facilities.
Reduce congestion related to increasing use of RideApps	As of December 2019, Massport relocated most RideApp drop-off/pick-up activity to the ground floor of the Central Parking Garage complex, with the exception of drop-off at terminal curbs during the 4:00 AM to 10:00 AM peak departure period. The garage provides weather-protected, climate-controlled areas for passengers, and includes wheelchair assistance, curbside baggage check, phone charging stations, and other amenities. Massport provides specific curbside locations at each terminal for drop-off/pick-up accommodations for persons with disabilities.
Increase the overall efficiency of the MBTA through interagency coordination	Massport participates in the Boston Metropolitan Planning Organization (MPO) to promote planning and funding of transportation system options that enhance access to the Airport. Massport and the MBTA have worked together on several initiatives including the renovated Blue Line Airport Station and the Silver Line bus service to Logan Airport. Massport has also partnered with the MBTA, the Massachusetts Department of Transportation (MassDOT), the City of Boston, and the Convention Center Authority in implementing transportation improvement plans recommended in the South Boston Waterfront, including sustainable transportation plans, as a means to improve the MBTA Silver Line access between South Station, the South Boston Waterfront, and the Airport.
Improve management of on-Airport ground access and infrastructure through technology	Massport disseminates ground access and parking information through the Internet (www.massport.com), social media (Twitter and Facebook), a toll-free telephone number (1-800-23-LOGAN), Smartraveler, and in-Airport kiosks. Massport's redesigned website has an interactive tool that helps users access Logan Airport, while providing multimodal options.

Source: Massport.

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6

Noise Abatement

This EDR focuses primarily on calendar years 2018 and 2019. However, due to the dramatic effects of the COVID-19 pandemic in 2020, Massport has strived to include relevant updates through fall 2020. Beginning in March 2020, flights in and out of Boston Logan International Airport (Logan Airport or the Airport) dramatically reduced and passenger levels dropped by over 90 percent at the peak of the pandemic in the spring and summer of 2020. As a result, there are far fewer aircraft operations and passengers and a dramatic drop in overall Logan Airport activity. While activity levels began a slow recovery in mid-summer 2020, the ongoing wave of COVID-19 cases has resulted in continued historically low levels of activity, with a full recovery years away. As of October 2020, total flight operations for the year were down by 50 percent and passenger levels were down by about 70 percent compared to January through October 2019. Massport expects that by the end of 2020, passenger levels will have dropped to levels of activity not seen since the mid-1970s.

The reduction in operations and changes in the fleet mix will likely result in a 40 percent or larger reduction in the day-night average sound level (DNL) noise contour for 2020. The severity and duration of the contraction in aircraft operations and air travel are unknown at this time and cannot be reasonably estimated until more certainty regarding the re-opening of cities, states, and the country is known. However, over the long term, it is expected that demand and airline capacity will grow in line with the US economy. Forthcoming Environmental Data Reports (EDRs) will continue to provide updates, as available. Due to the pandemic, several airlines have retired larger and older aircraft models such as Airbus A330 and A380, Boeing 747, 757, 767, and MD-88, Embraer 190, and the smaller CRJ200 regional jet. When air traffic does return, it is anticipated that the mix of aircraft types will be different than the aircraft mix documented in this EDR that were in use in 2018 and 2019. Massport continues to carefully review Airport activity levels and remains committed to implementing project-related mitigation strategies, as documented in Chapter 9, *Environmentally Beneficial Measures and Project Mitigation Tracking*.

Key Findings for 2018 and 2019

- The fleet mix of aircraft at Boston Logan International Airport (Logan Airport or the Airport) continues to be composed of aircraft types with the quietest available technology (Stage 5 is the quietest). About 15 percent of 2018 and 2019 operations were conducted in aircraft meeting Stage 5 requirements, 83 percent meeting Stage 4 requirements, and 2 percent in Certified Stage 3. While the shift to an all Stage 4 and 5 fleet has been gradual, the accelerated retirements of older aircraft in 2020 are likely to increase the share of Stage 5 in the Logan Airport fleet.
- There was an overall decrease in the total number of people residing within the day-night average sound level (DNL) 65 decibel (dB) contour from 2017 (7,933 people) to 2018 (7,034 people). However, the number within the DNL 65 dB contour increased in Winthrop and Revere while decreasing in East Boston. From 2017 to 2018, there was an increase in total operations and in nighttime operations, but the primary factor in the DNL contour changes was a shift in 2018 back to typical runway use following the extended Runway 4L-22R closure in 2017.
- The 2019 DNL contours are similar in shape and size to those for 2018, with small changes due to runway use shifts, increases in nighttime operations, and overall operations growth in 2019. The total number of people residing within the DNL 65 dB contour increased from 7,034 in 2018 to 8,768 in 2019. The additional population within the DNL 65 dB contour is mainly located in East Boston, primarily due to an increase in Runway 33L departures due to an increase in northwest winds in 2019.
- From 2010 through 2016, the Logan Airport commercial fleet showed a continuous trend toward larger jet aircraft, with steady decreases in the share of Regional Jet (RJ) operations. However, from 2017 to 2019, operations by RJs at Logan Airport have increased by about 25 percent. In contrast, from 2017 to 2019 large jets increased by 6 percent and non-jet operations by 4 percent.
- Nighttime operations represented 16.1 percent and 16.6 percent of total operations in 2018 and 2019, respectively. Nighttime operations increased, from an average of 168 per night in 2017 to 187 per night in 2018 and 195 per night in 2019. The main increases to nighttime commercial activity were in passenger aircraft operations, primarily resulting from the overall growth in domestic air carrier flights and increased flights to international destinations. The majority (about 81 percent) of nighttime operations occurred either before midnight or after 5:00 AM.
- Massport continues to seek funding for noise mitigation for properties that are eligible for participation in its Residential Sound Insulation Program (RSIP). In 2019, Massport updated its RSIP Noise Exposure Map contours and submitted an Aviation Environmental Design Tool (AEDT)-derived noise exposure map to the Federal Aviation Administration (FAA) in 2020 for review and discussion. To date, Massport has provided sound insulation for a total of 36 schools and 11,515 residential units with over $170 million invested since the start of the program.
- Massport and the FAA continue to work with the Massachusetts Institute of Technology (MIT) to identify opportunities to reduce noise through changes to performance-based navigation (PBN), including area navigation (RNAV). This is a first-in-the-nation project between the FAA and an airport operator to better understand the implications of PBN and evaluate strategies to address community concerns.
- In order to continue providing the Logan Airport Noise Office and the public with a state-of-the-art Noise and Operations Monitoring System (NOMS), Massport released a request for proposals to upgrade or replace the existing system in the summer of 2018 and selected an upgrade to the system and some noise monitors in late 2018. In 2019, upgrades to the system began to be implemented and to date six existing monitors have been upgraded with new equipment.

Introduction

Massport strives to minimize the noise effects of Logan Airport operations on its neighbors through a variety of noise abatement programs, procedures, studies, and other tools. At Logan Airport, Massport implements one of the longest standing and most extensive noise abatement programs of any airport in the nation. Massport's comprehensive noise abatement program includes a dedicated Noise Abatement Office; an industry leading Noise and Operations Monitoring System (NOMS); extensive residential and school sound insulation programs; time of day and runway restrictions for noisier aircraft; ground run-up procedures; and flight tracks designed to optimize over-water operations (especially during nighttime hours). The public can register noise complaints by phone or online through Massport's website.[1]

Massport's Noise Abatement Office is responsible for implementing noise abatement measures and generally monitoring community complaints and other aspects of the noise effects from Logan Airport operations. In addition to the initiatives listed above, highlights of activities that Massport has pursued as part of its noise program include:

- Encouraging retrofitting the Airbus A319/320/321 family of aircraft with vortex generators, which reduce tonal noise on approach.[2] United Airlines announced it was retrofitting its aircraft in 2017 as they went in for service. In a press release in October 2018[3], jetBlue Airways (the largest air carrier operator at Logan Airport) announced plans to retrofit its older Airbus fleet with Vortex Generators. These changes reflect the partnership between Massport and the airlines to reduce aircraft noise to benefit surrounding communities. As airlines retrofit aircraft and transition to the newer models of the A320 family, the number of aircraft operating at Logan Airport without the vortex generators is expected to decrease.
- Encouraging voluntary use of reduced-engine taxiing when appropriate and safe.
- Continuing improvement of the Noise Monitoring System. Massport went out to bid in 2018 and selected the prior vendor in 2019. Upgrades to the system and some noise monitors have begun.
- Continuing 24-hour prohibitions on use of Runway 4L for jet departures and Runway 22R for jet arrivals and for all other operations departing Runway 4L or arriving on Runway 22R between 11:00 PM and 6:00 AM.
- Continuing efforts to maximize late-night over-water operations. Preferential use of Runway 15R for departures and Runway 33L for arrivals continued.
- Continuing restriction on nighttime engine run-ups and use of auxiliary power units (APUs).
- Working with FAA to address issues with the first-generation sound insulation windows, subject to availability of funding.

1 Massport. Noise Complaints. http://www.massport.com/logan-airport/about-logan/noise-abatement/complaints/.

2 A vortex generator is a small device that disrupts wind over ports on the wing. Without the device, the wind can produce a "whistling" tone during the aircraft's approach into an airport.

3 The jetBlue Airways press release was published in Chapter 6 of the *2017 Environmental Status and Planning Report (ESPR)*.

This chapter describes the runway use, fleet mix, level of operations, noise levels, and modeled noise conditions at Logan Airport related to aircraft operations during 2018 and 2019 and compares the findings to those for 2017 and selected prior years.

Noise conditions for 2018 and 2019 were assessed primarily through detailed computer modeling, supplemented by the analysis of measured noise levels from Logan Airport's noise monitoring system. This *2018/2019 Environmental Data Report (EDR)* provides information on noise conditions modeled using the latest FAA noise modeling software, the Aviation Environmental Design Tool (AEDT). Massport began evaluating the use of AEDT for noise and air quality modeling after its release in 2015. Due to the historical use of several customized adjustments for Logan Airport to the Integrated Noise Model (INM), Massport engaged with the FAA from early 2016 to late summer 2017 to work towards a decision on incorporating all of these adjustments into AEDT. Massport transitioned to AEDT from the INM in its *2016 EDR*. As noted in that document, the AEDT modeling did not include the full suite of customized model adjustments historically applied to INM for accurate modeling of the unique Logan Airport environment.[4] However, the FAA did concur with the use of annual weather data and Logan Airport-specific aircraft stage length adjustments. Since the *2017 Environmental Status and Planning Report (ESPR)*, AEDT version 2d has been updated and replaced. The most current version at the time of this analysis is AEDT version 3c. The differences between model versions 2d and 3c pertain largely to additional aircraft types included in the aircraft noise and performance database and emissions calculations; except for the addition of a few new aircraft types, expected noise results between the two model versions are effectively the same.

Noise analysis results include annual DNL noise contours and estimates of the population residing within various increments of noise exposure for 2018 and 2019. This chapter also includes a comparison of the modeled results with measured levels for 2018 and 2019 from the noise monitoring system. Supplemental noise metrics include Logan Airport's Cumulative Noise Index (CNI), Time Above (TA) various threshold sound levels, and periods of dwell and persistence of noise levels to provide a better understanding of the noise environment. Massport also provides a progress report on ongoing noise abatement measures and any new noise abatement initiatives affecting Logan Airport.

Appendix H, *Noise Abatement*, provides historical details on aircraft operations, runway use, noise-exposed population, and the status of the sound insulation program since 1990. Total runway use from all operations, usage by runway end, and DNL levels at U.S. Census Block group locations are included. Appendix H also contains the *Flight Track Monitoring Report* for 2018 and 2019 and a *Fundamentals of Acoustics and Environmental Noise* section, which gives an overview of key noise issues, noise metric definition, and terminology for the general reader.

4 Massport's communications with the Federal Aviation Administration (FAA) regarding Logan Airport's specific noise modeling methodology and ongoing research through the Airport Cooperative Research Program (ACRP) are described in Appendix H.

Noise Metrics

The common metrics used in this chapter to describe and evaluate aircraft noise are:

- **Decibel (dB)** – dB is the unit of sound pressure level (SPL), the standard measure for sound. It is a logarithmic quantity reflecting the ratio of the pressure of the sound source of interest and a reference pressure. The range of SPL extends from about 0 dB for the quietest sounds that one can detect to about 120 dB for the loudest sounds we can hear without pain. Many sounds in our daily environment have SPL on the order of 30 to 100 dB.
- **"A"-weighted decibel (dBA)** – This metric applies frequency weighting (A-weighting) to the SPL to approximate the sensitivity of the human auditory system. Human hearing is less sensitive to both low and high frequency components of sound and most sensitive to mid-frequency sounds.
- **Day-Night Average Sound Level (DNL)** – The DNL is a measure of the cumulative noise exposure over a 24-hour day. It is the 24-hour, logarithmic (or energy) average. DNL treats nighttime noise differently than daytime noise; for the A-weighted sound pressure levels occurring at night (between 10:00 PM and 7:00 AM), a 10-dB weighting is applied to the nighttime event to reflect the greater sensitivity to nighttime sound. DNL is the FAA's recommended metric for assessing noise and land use compatibility.[5]
- **Time Above (TA)** – The TA metric describes the total number of minutes that instantaneous sound levels (usually from aircraft) are above a given threshold. For example, if 65 dB is the specified threshold, the metric would be referred to as "TA65." The TA metric is typically associated with a 24-hour average annual day but can be used to represent any time period. The TA calculation can use any threshold. For this study, each of the monitoring sites report TA65, TA75, and TA85 results.
- **Effective Perceived Noise Level (EPNL)** – The EPNL calculation uses a time series of "tone corrected" perceived noise levels, reported in units of EPNdB. The tone corrected perceived noise level is determined by measuring the perceived noise level and adding to that value a "pure-tone" correction of up to 6 dB. The EPNdB is an international standard metric for the noise certification of aircraft and is part of the calculation of CNI[6] for this report.

For a more in-depth description of noise metrics, refer to Appendix H, *Noise Abatement*.

In 2015, the FAA began a multi-year effort to update the scientific evidence on the relationship between aircraft noise exposure and its effects on communities around airports.[7] This was the most comprehensive study using a single noise survey ever undertaken in the United States, polling communities surrounding 20 airports nationwide. The FAA Reauthorization Act of 2018 under Section 188 and 173, required FAA to complete the evaluation of alternative metrics to the DNL standard within one year. The Section 188 and 173 Report to Congress was delivered on April 14, 2020[8] and concluded that while no single noise metric can cover all situations, DNL provides the most comprehensive way to consider the range of factors influencing exposure to

5 14 Code of Federal Regulations Part 150, Appendix A to Part 150 Noise Exposure Maps, Sec. A150.101(b).

6 Cumulative Noise Index (CNI) is a metric developed specifically for Logan Airport and defined in the Logan Airport Noise Rules. A full description of this metric and the results for 2017 are provided later in this chapter.

7 Federal Aviation Administration. Press Release – FAA To Re-Evaluate Method for Measuring Effects of Aircraft Noise. https://www.faa.gov/news/press_releases/news_story.cfm?newsId=18774

8 Federal Aviation Administration. *Report to Congress on an evaluation of alternative noise metrics.* https://www.faa.gov/about/plans_reports/congress/media/Day-Night_Average_Sound_Levels_COMPLETED_report_w_letters.pdf

aircraft noise. In addition, use of supplemental metrics is both encouraged and supported to further disclose and aid in the public understanding of community noise impacts. In line with this conclusion, as Massport has historically done, the *2018/2019 EDR* provides DNL noise results along with various supplemental metrics such as Cumulative Noise Index, Time Above and Time Above Night.

Regulatory Framework

Appendix H, *Noise Abatement,* provides the noise regulatory framework that this *2018/2019 EDR* follows. Regulations discussed include:

- *Logan Airport Noise Abatement Rules and Regulations (Noise Rules):* The Noise Rules have been in effect since 1986. The Noise Rules place restrictions on certain aircraft and ground operations by time of day and runway, subject to implementation by FAA with regard to airport and airspace safety.
- *Federal Aviation Regulation (FAR) Part 36*: This regulation specifies the metrics, methods, and reporting required for aircraft noise certification.
- *FAR Part 150*: This regulation provides a process and guidance for voluntary FAA-sponsored noise assessment and abatement programs at airports.
- *FAR Parts 91 and 161*: These regulations address noise-related restrictions on aircraft operations.

Noise Modeling Process

The sections below provide an overview of the noise modeling methodology and assumptions used in this *2018/2019 EDR*. For this noise assessment, Massport used the FAA required AEDT model, version 3c. The DNL, CNI, and TA noise metrics reported annually by Massport provide a means of understanding and comparing Logan Airport's complex noise environment from one year to the next. The numbers of operations, types of aircraft operating during the day and at night, use of various runway configurations, and the location and frequency of flight paths to and from the Airport all influence the noise environment. Change in any one operational parameter from one year to the next can cause changes in the values of the noise metrics and alter the shape of the noise exposure contours that represent the accumulation of noise events during an average annual day.

Massport continues to make use of current developments in the noise modeling process each year as technologies improve. The following list provides a summary of the technologies and techniques employed in this *2018/2019 EDR*.

- Massport's NOMS provides all available radar data for modeling and noise measurement data for reporting.[9]
- The flight operations data from the NOMS includes detailed information with each flight record, such as aircraft registration numbers, wherever possible, which allows for the assignment of the modeled

9 The noise measurement data are only used for reporting and are not used to calibrate the noise model.

AEDT aircraft type based on the specific aircraft and engine combination used on each flight at Logan Airport during 2018 and 2019.

- The modeling process includes continued use of U.S. Geological Survey digital terrain data. AEDT uses the detailed terrain data to evaluate each receptor location at its proper elevation, which enhances the accuracy of the results.
- The population data analysis employs Geographic Information System (GIS) technology to calculate proportional estimates from 2010 U.S. Census Block data, refining the accuracy of those counts.
- A proprietary AEDT pre-processor that prepares large quantities of daily radar data for processing by AEDT is used. Standard AEDT analyses (without the pre-processor) rely on assigning all operations to a limited number of prototypical or representative tracks, apply a generalized distribution for runway usage and day/night split, and rely on other aggregated data for choice of modeled aircraft type and flight profile. Use of the AEDT pre-processor improves the precision of modeling by:
  - Automating the production of noise contours directly from each individual radar trace. For 2018, 424,865 traces were collected and 416,992 retained enough information to be converted by the pre-processor into AEDT flight tracks. For 2019, 424,286 traces were collected and 410,663 retained enough information to be converted into AEDT. Each radar trace was converted to a model track, ensuring that the lateral dispersion of radar tracks was retained in the modeling. The operations on these radar traces were then scaled to account for all the 424,024 operations in 2018 and the 427,176 operations in 2019.
  - Providing greater detail than standard AEDT analyses through the use of individual flight tracks taken directly from the radar system rather than relying on consolidated, representative flight tracks data.
  - Modeling each operation for the actual time of day and on the specific runway that it actually used, rather than applying a generalized distribution to broad ranges of aircraft types.
  - Selecting the specific airframe and engine combination to model, on an operation by operation basis, based on the aircraft registration or a published composition of the fleets of the specific airlines operating at Logan Airport.
  - Using each flight's origin and destination to select the proper stage length.
  - Using each aircraft's actual altitude profile to select from the available flight profiles for each aircraft type in the AEDT database.

Noise Model Inputs

Calculations of noise for the *2018/2019 EDR* used the most recently available version of FAA's AEDT model, version 3c (AEDT 3c). Appendix H, *Noise Abatement*, contains detailed information about the noise model in the section titled *AEDT Noise Analysis*. The AEDT model requires detailed operational data as inputs for noise calculations, including numbers of operations per day by aircraft type and by time of day, as well as runway identification and flight track geometry for each flight. The Massport NOMS system provides the track and operations data for noise modeling, which incorporates the L3Harris NextGen[10] radar data feed. This data feed

10 The NextGen data feed is a product of L3Harris: https://www.harris.com/solution/nextgen-data-subscription

integrates information from ground-based radar and other sensors with transponder data from aircraft. Further detail about this system is contained in the section *2018/2019 Radar Data* in Appendix H, *Noise Abatement*.

The following section summarizes the average-day operations as used in the noise modeling and compares 2018 and 2019 inputs to the inputs for 2017.

Fleet Mix

Since 2004, Massport has relied primarily on radar data as the main source of input for noise calculations, because radar data are typically more accurate than the information reported by airlines. The radar data produces a list of approximately 500 different aircraft types that use Logan Airport during a year, including the wide variety of small corporate jets and propeller aircraft flown by general aviation (GA) users, as well as the large passenger and cargo jets operated by air carriers.

For 2018 and 2019, the aircraft types identified by the radar data were matched to the AEDT 3c database, which contains individual noise and performance profiles for 258 different fixed-wing aircraft types, 174 of which represent civilian aircraft, the balance being military aircraft.[11] For those aircraft recorded in radar data that are not in the AEDT database, the radar type is paired with the best available alternative using an aircraft substitution list included in the AEDT model. The final list of modeled aircraft, used as an input to AEDT, is presented in detail in Appendix H, *Noise Abatement*.

Operations by aircraft type are summarized into several key categories: commercial (passenger and cargo) or GA operations; FAR Part 36 noise category;[12] and turboprop or propeller (non-jet) aircraft. Additionally, aircraft operations are split into daytime and nighttime periods, where nighttime hours are defined as 10:00 PM to 7:00 AM. Operations occurring during nighttime hours incur a 10 dB weighting when included in the DNL modeling calculation.

Table 6-1 summarizes the number of average daily operations by category of aircraft operating at Logan Airport in 2018 and 2019 and provides comparison data for 2017 as well as for reference years 1990, 2000, 2010, and 1998, the year of peak operations at Logan Airport. Available data for each year prior to 2017 are included in Appendix H, *Noise Abatement*. Overall annual operations increased from 401,371 operations in 2017 to 424,024 in 2018 (a 5.6-percent increase) and 427,176 in 2019 (0.7 percent more than 2018).

Commercial Operations

The majority of operations (approximately 93 percent) at Logan Airport are commercial (passenger, cargo and charter) flights, with the remaining approximate 7 percent GA flights. For 2018, operations by commercial air carrier jets increased by 4.7 percent compared to 2017, an average increase of about 36 flights per day. In 2019, there was an increase of about eight more air carrier jets per day (an additional 1.0 percent from 2018).

11 Some of the 282 aircraft in the database are military types, older Stage 1 and 2 airplanes that no longer operate in the U.S., or aircraft that do not operate at Logan Airport. There are ordinarily no military aircraft operations at Logan Airport.

12 Stage 3, 4 and 5 categories include any aircraft that meet the requirements for either Stage 3, Stage 4 or Stage 5 FAA noise categories. Note that many aircraft originally certificated as Stage 3 or Stage 4 would in fact satisfy the newer Stage 4 and 5 criteria if recertificated. FAA does not require aircraft to be recertificated and FAA has no plans at this time to restrict Stage 3 operations. Massport does not have the regulatory authority to restrict aircraft using Logan Airport.

Commercial non-jet operations (such as Cape Air and Porter Airlines) increased by 6.5 percent from 2017 to 2018, from about 121 operations per day in 2017 to 129 operations per day in 2018, but then decreased 2.6 percent from 2018 to 2019.

The biggest changes in operations by category from 2017 to 2018 and then to 2019 are in regional jet (RJ) aircraft. RJs are defined as those aircraft with 90 or fewer seats, consistent with the categorization in Chapter 2, *Activity Levels*.[13] For years prior to 2010, the RJs in EDRs and ESPRs were classified as aircraft with fewer than 100 seats. When RJs first started gaining popularity, the aircraft types available were typically 50 seats or fewer with the traditional air carrier jet being 100 seats and higher. As newer aircraft types have become available, the smaller 35- to 50-seat types have been replaced by 70- to 99-seat types, with the 90 and above seat types flying many of the traditional air carrier routes. Therefore the 90 seat and higher aircraft types are classified as air carrier. From 2010 through 2016, the Logan Airport fleet showed a continuous trend toward larger aircraft, with steady decreases in the share of RJ operations. However, from 2017 to 2019, operations by RJs at Logan Airport have increased by about 25 percent.

As shown in **Table 6-1**, air carrier jets continued to dominate the commercial fleet with over 76 percent of commercial operations in 2017, 2018, and 2019. Commercial aircraft accounted for the entire net annual increases in operations, as the numbers of non-commercial operations, all categorized as GA activity, decreased slightly.

The share of RJs in the Airport's overall commercial fleet increased from 11 percent in 2017 to about 12 percent in 2018 and 2019. Non-jets' share of the commercial fleet remained at about 12 percent. **Figure 6-1** presents the commercial aircraft operations by category in terms of percent of the total for each year from 2010 through 2019. This figure demonstrates the decrease in commercial non-jet operations after 2000 and the rise of the RJ category in the fleet mix. The RJ share showed a gradual decrease through 2016 due to the trend among carriers of operating larger aircraft. This trend seems to have reversed somewhat in more recent years.

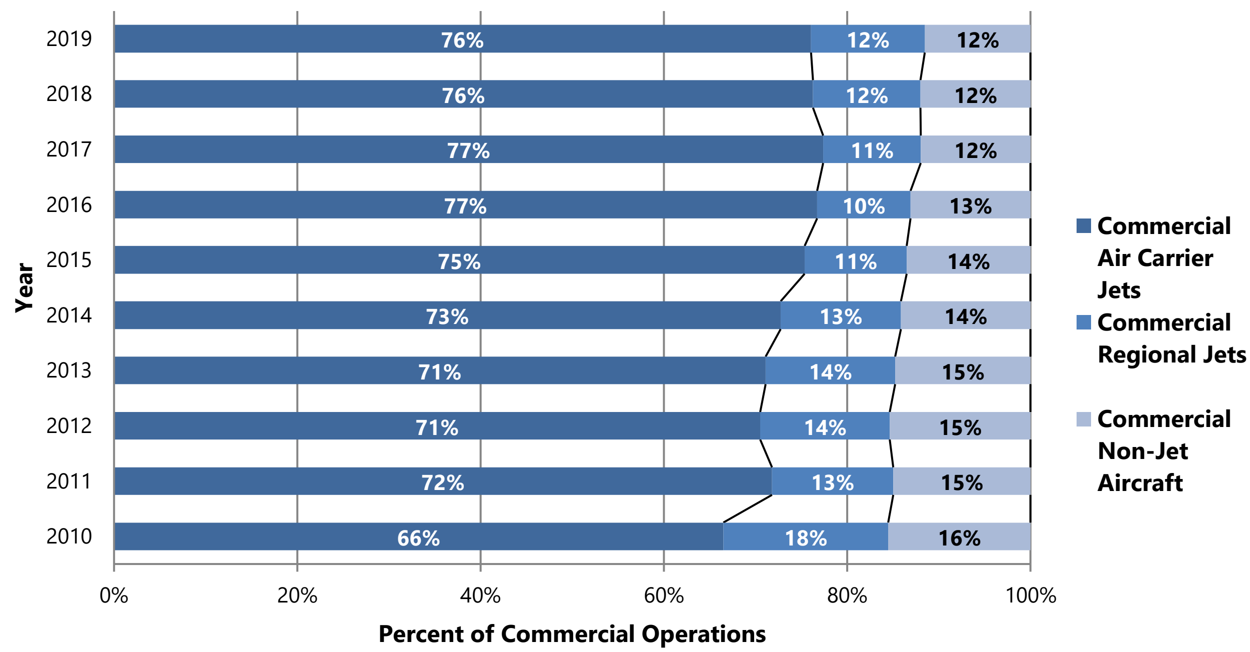
13 U.S. Code, 2006 Edition, Supplement 3, Title 49 – Transportation Subtitle VII – Aviation Programs Part A – Air Commerce and Safety, Subpart II, Economic Regulation, Chapter 417 - Operations or Carriers, Subchapter III - Regional Air Service Incentive Program, Sec. 41762 – Definitions – defines regional jet air carrier service to be aircraft with a maximum of 75 seats. Therefore, this report categorizes aircraft with 70 to 75 seats and fewer as regional jets and aircraft with 90 seats and higher aircraft as air carriers (note that there are no aircraft types with between 75 and 90 seats).

Table 6-1 Modeled Average Daily Operations by Commercial and General Aviation (GA) Aircraft[1]

		1990[2,3]	1998	2000[4]	2010[5]	2017	2018	2019	Change 2017 to 2018	Change 2018 to 2019
Commercial Aircraft Operations (Passenger and Cargo)										
Air Carrier Jets	Day	601.3	626.4	649.0	521.6	636.0	657.2	655.6	3.3%	(0.3%)
	Night[6]	77.2	101.5	99.8	94.0	148.8	164.1	174.3	10.3%	6.2%
	Total	**678.5**	**727.8**	**748.7**	**615.6**	**784.8**	**821.3**	**829.9**	**4.7%**	**1.0%**
Regional Jets	Day	N/A[2]	N/A[2]	78.1	152.6	98.4	113.4	123.5	15.2%	8.9%
	Night[6]	N/A[2]	N/A[2]	3.9	13.9	9.7	13.1	11.9	34.1%	(8.5%)
	Total	**N/A[2]**	**N/A[2]**	**82.0**	**166.6**	**108.2**	**126.5**	**135.4**	**16.9%**	**7.1%**
Commercial Non-Jets	Day	444.4	552.6	409.6	138.5	119.0	126.8	124.1	6.5%	(2.1%)
	Night[6]	11.7	21.9	21.6	5.2	2.2	2.4	1.7	5.1%	(27.9%)
	Total	**456.1**	**574.4**	**431.2**	**143.7**	**121.3**	**129.1**	**125.8**	**6.5%**	**(2.6%)**
Total Commercial Operations	Day	1,045.7	1,178.9	1,141.8	812.8	853.5	897.4	903.2	5.1%	0.6%
	Night[6]	89.0	123.3	125.5	113.1	160.7	179.5	187.9	11.7%	4.7%
	Total	**1,134.7**	**1,302.2**	**1,267.4**	**925.9**	**1,014.2**	**1,076.9**	**1,091.1**	**6.2%**	**1.3%**
GA Aircraft Operations										
GA Jets	Day	N/A[3]	35.8	47.4	28.1	52.2	55.8	53.2	6.9%	(4.7%)
	Night[6]	N/A[3]	4.6	3.9	3.3	4.6	5.1	4.8	11.3%	(5.6%)
	Total	**N/A[3]**	**40.4**	**51.2**	**31.3**	**56.8**	**60.9**	**58.0**	**7.2%**	**(4.7%)**
GA Non-Jets	Day	N/A[3]	37.3	34.6	8.2	26.4	22.0	19.4	(16.7%)	(12.0%)
	Night[6]	N/A[3]	16.3	1.8	0.7	2.3	1.9	1.9	(15.3%)	(0.2%)
	Total	**N/A[3]**	**53.57**	**36.4**	**8.9**	**28.7**	**23.9**	**21.3**	**(16.6%)**	**(11.0%)**
Total GA Operations	Day	N/A[3]	73.1	81.9	36.3	78.6	77.8	72.5	(1.1%)	(6.7%)
	Night[6]	N/A[3]	20.9	5.7	4.0	6.8	7.0	6.7	2.5%	(4.2%)
	Total	**N/A[3]**	**94.0**	**87.6**	**40.2**	**85.4**	**84.8**	**79.2**	**(0.8%)**	**(6.5%)**
Total Aircraft Operations										
Combined Commercial and GA	Day	1,045.7	1,252.0	1,223.8	849.0	932.1	975.2	975.7	4.6%	0.0%
	Night[6]	89.0	144.2	131.2	117.1	167.5	186.5	194.6	11.3%	4.4%
	Total[3]	**1,134.7**	**1,396.2**	**1,355.0**	**966.1**	**1,099.6**	**1,161.7**	**1,170.3**	**5.6%**	**0.7%**

Source: Massport's Noise Monitoring System, Revenue Office and HMMH, 2020.
Notes: Totals may not add exactly due to rounding. Changes in ( ) represent a decrease.
1 Operations include scheduled and unscheduled operations. Data for other years are available in Appendix H, *Noise Abatement*.
2 Regional Jets (RJs) were not tracked separately prior to 1999.
3 Totals prior to 1998 do not include GA operations.
4 Prior to 2010, the split between air carrier jets and RJs is 100 seats with RJs having less than 100 seats.
5 After 2009, the split between air carrier jets and RJs is 90 seats with RJs having less than 90 seats.
6 Nighttime operations occur between 10:00 PM and 7:00 AM.

Figure 6-1 Fleet Mix of Commercial Operations (Passenger and Cargo) at Logan Airport



Source: HMMH, 2020.
Notes: Includes both passenger and cargo operations.
Since 2010, the split between air carrier jets and regional jets (RJs) is 90 seats with RJs having fewer than 90 seats.
Prior to 2010, the split between air carrier jets and RJs was 100 seats with RJs having fewer than 100 seats.
The share of RJs as a percentage of the commercial fleet was not tracked prior to 2000.

FAA Jet Aircraft Noise Categories

All jet aircraft in the U.S., including those currently operating at Logan Airport, are categorized according to their noise emission levels by the FAA as either Stage 3, Stage 4, or Stage 5. The oldest and noisiest aircraft, Stage 1, were phased out of service in the 1980s. The FAA banned Stage 2 aircraft operations in the contiguous U.S. as of December 31, 2015, and recently adopted a higher (quieter) standard of noise classification called Stage 5. Stage 5 aircraft are certificated as a cumulative 17-dB below Stage 3 standards and will be effective for new aircraft type certification after December 31, 2017 and December 31, 2020, depending on the weight of the aircraft.[14] Approximately 15 percent of the Logan Airport jet fleet already meets Stage 5 standards and that percentage is expected to grow. Appendix H, *Noise Abatement*, provides more detail on the aircraft stage designations regulated by FAR Part 36 and the regulatory framework governing aircraft noise.

Examples of Stage 3, Stage 4, and Stage 5 aircraft types currently operating at Logan Airport are shown in **Table 6-2**. As shown in the table, noise levels decrease with each stage of aircraft design. The regulation provides a Stage 3 noise limit for each aircraft that is dependent on the aircraft's weight. A cumulative level, determined by summing the certification lateral, flyover, and approach values can be compared against the

14 The Stage 5 Final Rule was published on October 5, 2017.
https://www.federalregister.gov/documents/2017/10/04/2017-21092/stage-5-airplane-noise-standards.

permissible limit. The columns on the right side of **Table 6-2** show this sum, the limit for that aircraft, and the dB difference. The Stage 5 aircraft shows the greatest difference, at over 32 dB below the Stage 3 limit.

Due to noise differences among aircraft, Massport tracks operations by aircraft certification/stage. **Table 6-3** provides the percentage of commercial jet operations by stage for the past three years with 1990, 1998, 2000, and 2010 also reported for historical context. As noted in **Table 6-3**, 98 percent of the 2018 and 2019 commercial jet fleet at Logan Airport meets at least Stage 4 requirements. About 15 percent of Logan Airport's commercial jet fleet complied with the FAA's newest noise category, Stage 5, for both 2018 and 2019. This percent is lower than 2017 due to the increase in the RJ fleet which are mostly Stage 4 variants. **Table H-3** in Appendix H, *Noise Abatement* provides data for every year since 1998.

Nighttime Operations

Massport monitors flights that operate during the DNL nighttime period of 10:00 PM to 7:00 AM, when each modeled flight is increased by 10 dB in calculations of noise exposure. **Table 6-4** shows this nighttime activity by different groups of aircraft. Commercial jet nighttime operations increased from an average 159 operations per night in 2017 to 177 per night in 2018 and 186 per night in 2019. Commercial non-jet and GA nighttime operations remained close to their annual averages of about two and seven operations per night as seen in 2017. Nighttime operations represented 16.1 percent and 16.6 percent of total operations for 2018 and 2019, respectively, at Logan Airport.

Total nighttime operations increased 11.3 percent from 2017 to 2018, and from 2018 to 2019 nighttime operations increased another 4.4 percent. Nighttime cargo operations accounted for 5.3 percent of all commercial nighttime operations in 2017; that percentage decreased to 4.9 percent for 2018 and to 4.8 percent for 2019. The main increases to nighttime commercial activity were in passenger aircraft operations, primarily resulting from the overall growth in domestic air carrier flights and increased flights to international destinations.

As in years past, the majority of nighttime operations (between 10:00 PM and 7:00 AM) occurred either before midnight or after 5:00 AM, as shown in **Figure 6-2**, to accommodate connecting flights and international time zones. The percentage of nighttime operations occurring between 10:00 PM and midnight or between 5:00 AM and 7:00 AM was 81.7 percent in 2017, 81.5 percent in 2018, and 80.9 percent in 2019.

Table 6-2 Example Stage 3, Stage 4, and Stage 5 Aircraft Types Operating at Logan Airport

Name	Model	Noise Stage Equivalent	Cumulative Level[1]	Stage 3 Limit	dB Difference	Percent below limit
Embraer 175	EMB175	3	272.8	282.0	9.2	3.4%
737-700	CFM56-7B22	4	274.1	288.1	14.0	4.9%
787-8R[2]	Trent 1000-A2	5	271.2	303.2	32.0	10.6%

Source: EASA MAdB Jets(200213) Certification data
1 Cumulative levels include lateral, overflight, and approach noise.
2 The original Stage 3 noise limits are based on aircraft weight. Since the 787-8R is a larger aircraft than the Boeing 737 family, the certification levels to meet Stage 5 are higher.

Table 6-3 Percentage of Commercial Jet Operations by Part 36 Stage Category

Year[1]	Stage 5 Requirements[5]	Stage 4 Requirements[2]	Certificated Stage 3	Recertificated Stage 3[3]	Stage 2 (Greater than 75,000 lbs.)	Total
1990	N/A	N/A	51.1%	0.0%	48.9%	100%
1998	N/A	N/A	65.9%	21.7%	12.4%	100%
2000	N/A	N/A	75.0%	24.0%	1.0%	100%
2010	N/A	93.2%	5.7%	1.1%[4]	0.0%	100%
2017	17.7%	79.8%	2.4%	0.0%	0.0%	100%
2018	15.5%	83.0%	1.5%	0.0%	0.0%	100%
2019	15.2%	82.9%	2.0%	0.0%	0.0%	100%

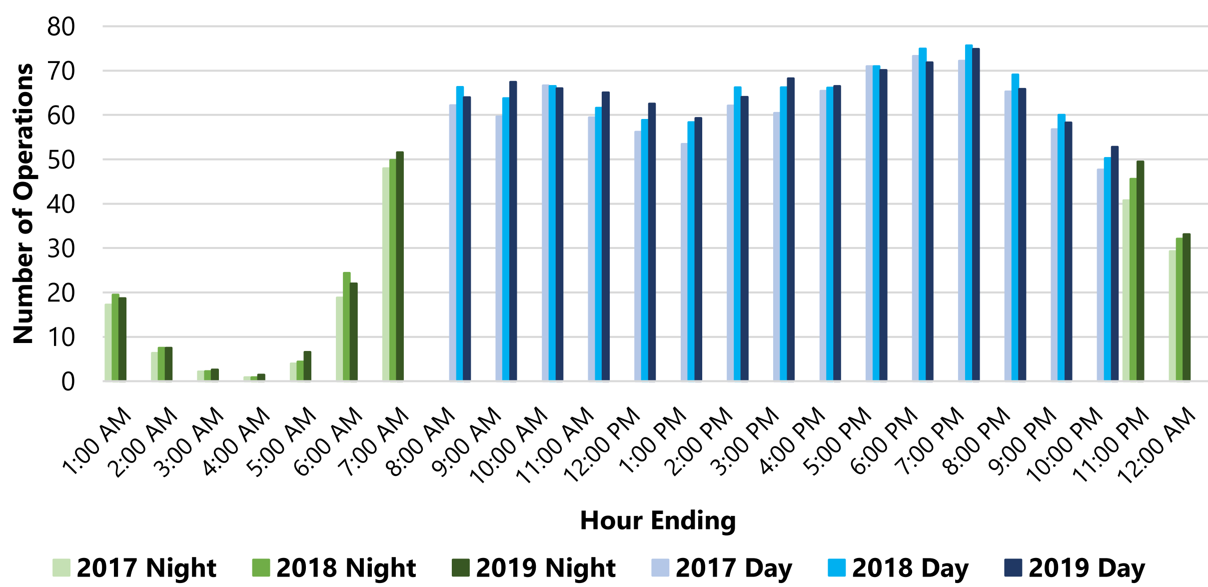
Source: Massport's Noise Monitoring System, Revenue Office and HMMH 2020.
Notes: Totals may not add exactly due to rounding.
1 Data for all years beginning in 1998 are available in Appendix H, *Noise Abatement*.
2 Aircraft counted as Stage 4 are aircraft that are certificated Stage 4 or would qualify if recertificated. Certificated Stage 4 aircraft became available in 2006 and the level of aircraft meeting Stage 4 requirements was not determined prior to 2009.
3 Recertificated Stage 3 aircraft are aircraft originally manufactured as a certificated Stage 1 or 2 aircraft under Federal Aviation Regulation (FAR) Part 36 that either have been retrofitted with hushkits or have been re-engined to meet Stage 3 requirements.
4 Prior to 2013, only one commercial carrier with more than 100 annual operations continued to use recertificated Stage 3 aircraft at Logan Airport (FedEx). A few charter operators also use these aircraft.
5 Aircraft counted as Stage 5 are aircraft that are certificated Stage 5 or would qualify if recertificated. Stage 5 aircraft certification was available beginning in 2018 for aircraft with a maximum certificated takeoff weight greater than 121,254 lbs. The level of aircraft that meet Stage 5 requirements was not determined prior to 2016.

Table 6-4 Modeled Nighttime Operations (10:00 PM to 7:00 AM) at Logan Airport Per Night[1]

Year	Commercial Jets	Commercial Non-Jets	General Aviation	Total
1990	77.2	11.7	N/A[2]	89.0
1998	101.4	21.9	20.9[3]	144.2
2000	103.9	21.6	5.7	131.2
2010	107.9	5.2	4.0	117.1
2017	158.5	2.2	6.8	167.5
2018	177.2	2.4	7.0	186.5
2019	186.2	1.7	6.7	194.6
Change (2017 to 2018)	**18.7**	**0.1**	**0.2**	**18.9**
Percent Change	11.8%	5.1%	2.5%	11.3%
Change (2018 to 2019)	**9.1**	**-0.7**	**-0.3**	**8.2**
Percent Change	5.1%	-27.9%	-4.2%	4.4%

Source: Massport and L3Harris radar data; and HMMH, 2020.
Notes: Totals may not add exactly due to rounding. Changes in ( ) represent a decrease.
1 Data for all years beginning in 1990 are available in Appendix H, *Noise Abatement*.
2 Totals prior to 1998 do not include general aviation (GA) operations.
3 Previously reported as N/A. 1998 was the first year GA operations were reported and included in the total nighttime operations.

Figure 6-2 Average Hourly Operations, 2017 - 2019



Source: HMMH, 2020.

Runway Use

Logan Airport's runways are shown in **Figure 6-3**. Runway 15R-33L and Runway 4R-22L are Logan Airport's longest runways; each of these is just over 10,000 feet in length.

Runway use refers to the frequency with which aircraft use each of these runways during the year, as dictated or permitted by availability, wind, weather, aircraft performance, demand, and air traffic control conditions. For noise abatement reasons, Runway 15R-33L is the preferred runway to use at night, with arrivals to Runway 33L and departures from Runway 15R (known as head-to-head procedures), thus keeping flights over Boston Harbor as much as possible (although many of these flights do fly over North Shore or South Shore communities once reaching higher altitudes).

Normally during other periods of the day, Runway 9 and 22R are used primarily for departures, and Runways 4R and 22L are used primarily for arrivals. Typically, Runways 15R, 27, and 33L are used for both arrivals and departures.

Operations on Runway 27 and Runway 22R are known as Converging Runway Operations (CRO) because the extended centerlines of these runways cross within a short distance. During periods of high demand, and when Runway 22R is in use for departing aircraft, arrivals that would typically be directed to Runway 27 are sent by FAA Air Traffic Control to arrive on Runway 22L.

Runway 14-32 is unidirectional; there are no arrivals to Runway 14 and no departures from Runway 32. Additionally, Runway 14-32 can be used only during northwest or southeast wind conditions[15] when winds are 10 knots or greater. Under certain northwest wind conditions, Runway 32 provides FAA with a second arrival runway, thereby reducing delays at Logan Airport. Runway 14 is available for departures but is rarely used in that manner.

Runway 15L-33R is Logan Airport's shortest runway, at under 3,000 feet long. This runway is primarily used for small non-jet aircraft arrivals.

15 The Runway 14-32 restrictions are a condition of the Logan Airside Improvements Project Record of Decision (ROD).

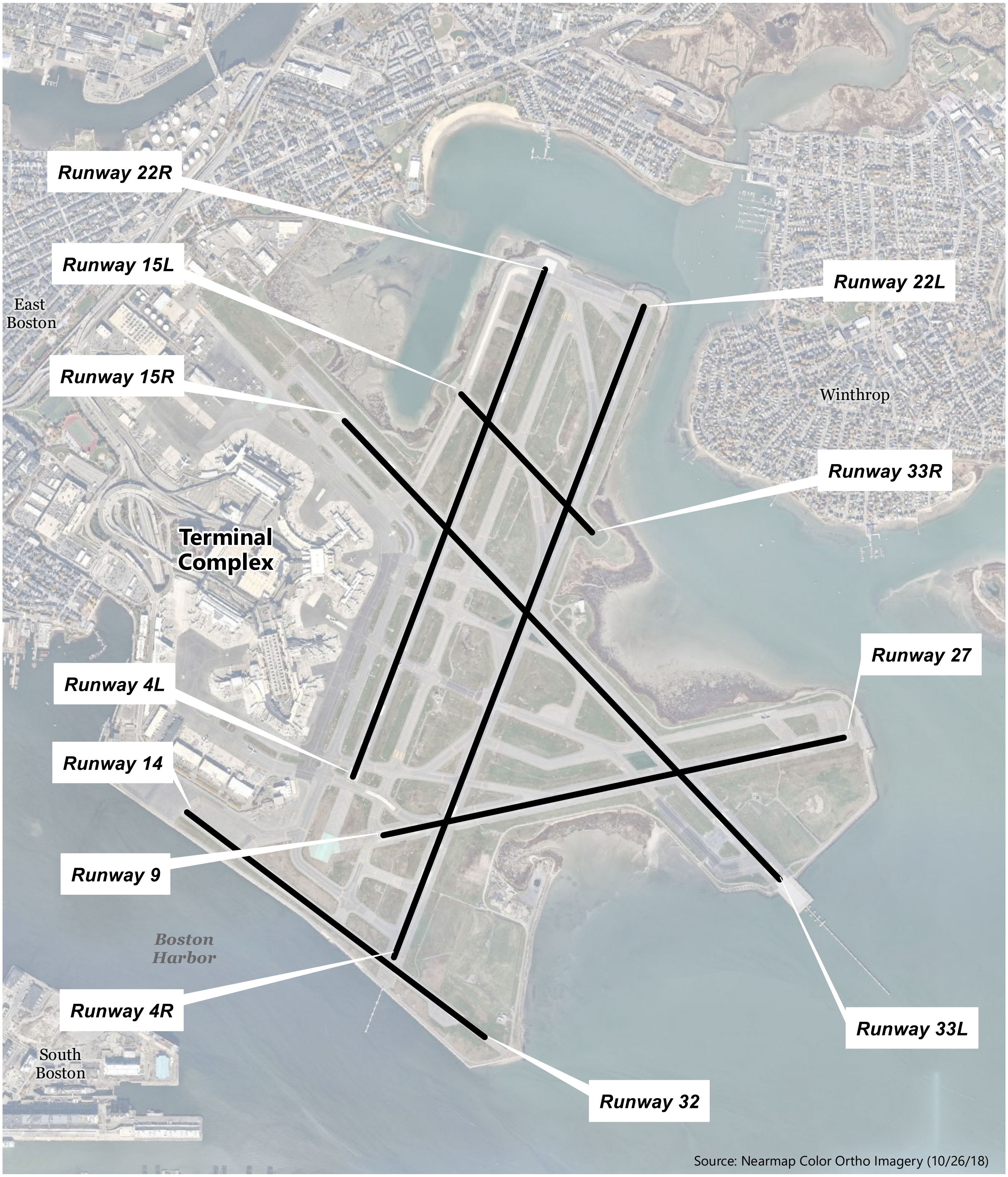


FIGURE 6-3 Logan Airport Runways

0 500 1000 2000 Feet

Table 6-5 provides a summary of jet runway use conditions in 2018 and 2019, with recent years and historical years provided for comparison. In 2017, Logan Airport had an extended closure of Runway 4R-22L for reconstruction. The runway was unavailable from May 15 to June 23 (35 days), with limited availability for Runway 4R arrivals through September 15, 2017. Much of the difference in runway usage rates from 2017 to 2018 is attributable to the extended closure of Runway 4R-22L during 2017; the 2018 and 2019 usage generally resembles the usage patterns observed in 2015 and 2016.

The following compares the jet runway use in 2018 and 2019 to the previous year for each:

2017 to 2018

- For departures, use of Runway 22R increased the most, from 28 percent in 2017 to 34 percent in 2018. Departures from Runway 9 also increased, from 25 percent in 2017 to 30 percent in 2018. Correspondingly, departures from Runways 27 and 33L decreased from 2017 to 2018.
- For arrivals, Runway 4R accommodated 30 percent and Runway 22L handled 32 percent of jet aircraft in 2018. Runways 27 and 33L carried most of the remaining arrivals, with 21 percent and 12 percent, respectively. Compared to 2017, usage of Runways 4R and 22L increased, while usage of Runways 15R, 27, and 33L decreased.

2018 to 2019

- The runway usage patterns for 2019 were similar to those of 2018 with an increase in the Northwest Flow configuration[16]. Changes that can be observed from 2018 to 2019 are trending towards normal levels of usage.
- For departures, the proportion of jets taking off from Runways 15R and 22R decreased from 2018 to 2019, while the share of jets taking off from Runways 27 and 33L increased.
- For arrivals, the only notable difference from 2018 to 2019 is that about 3 percent of jet operations shifted from landing on Runway 22L to landing on Runway 33L instead.

Detailed runway usage for all aircraft types (jet and non-jet) for 2018 and 2019 is provided in Appendix H, *Noise Abatement*.

16 Northwest Flow is comprised of arrival and departure operations using Runways 33L and 27

Table 6-5 Summary of Annual Jet Aircraft Runway Use[1]

	Runway									
	4L	**4R**	**9**	**14[2]**	**15R**	**22L**	**22R**	**27**	**32[2]**	**33L**
1990										
Departures	0%	3%	21%	N/A	10%	2%	36%	20%	N/A	7%
Arrivals	1%	25%	0%	N/A	2%	14%	0%	28%	N/A	29%
1998										
Departures	0%	8%	35%	N/A	6%	5%	28%	14%	N/A	5%
Arrivals	2%	41%	0%	N/A	2%	7%	0%	28%	N/A	19%
2000										
Departures	0%	8%	35%	N/A	4%	3%	30%	15%	N/A	6%
Arrivals	4%	40%	0%	N/A	1%	7%	0%	28%	N/A	20%
2010										
Departures	0%	4%	28%	<1%	8%	2%	31%	10%	0%	17%
Arrivals	5%	28%	0%	0%	1%	15%	0%	32%	1%	16%
2016										
Departures	0%	4%	30%	0%	6%	2%	27%	13%	0%	18%
Arrivals	4%	31%	0%	0%	1%	24%	<1%	23%	1%	16%
2017										
Departures	0%	2%	25%	0%	5%	1%	28%	15%	0%	23%
Arrivals	5%	21%	0%	0%	5%	23%	<1%	27%	2%	18%
2018										
Departures	<1%	4%	30%	0%	5%	2%	34%	10%	0%	16%
Arrivals	4%	30%	0%	0%	<1%	32%	<1%	21%	1%	12%
2019										
Departures	0%	4%	30%	0%	4%	2%	28%	12%	0%	20%
Arrivals	4%	28%	0%	0%	<1%	29%	<1%	22%	2%	15%

Source: Massport Noise Office and HMMH, 2020.

Notes: These data reflect actual percentages of jet aircraft operations on each runway end. They should not be confused with effective runway use.
Jet aircraft are not able to use Runway 15L or 33R due to its length of only 2,557 feet.
Totals may not add exactly due to rounding.

N/A Not available.

1 Data for all years beginning in 1990 are available in Appendix H, *Noise Abatement*.

2 Runway 14-32 opened in late November 2006. Runway 14-32 is unidirectional with no arrivals to Runway 14 and no departures from Runway 32.

Preferential Runway Advisory System (PRAS)

To provide an equitable distribution of Logan Airport's noise impacts on surrounding communities, in 1982 Massport developed the Preferential Runway Advisory System (PRAS). The system was enhanced in 1990 and in subsequent years. The two primary objectives of PRAS were to equitably distribute noise on an annual basis and to provide short-term relief from continuous operations over the same neighborhoods at the ends of the runways.

PRAS consisted of two parts: (1) a set of specific runway use goals to address the PRAS objectives, and (2) a computer program that would provide runway configuration recommendations to air traffic controllers based on weather, traffic, and PRAS goals. In February 2004, the PRAS system was suspended due to an upgrade of the FAA radar system during the consolidation of the Boston Terminal Control Center at the new facility in Merrimack, New Hampshire.

During Phase 2 of the Boston Logan Airport Noise Study (BLANS), the Logan Airport Community Advisory Committee (CAC) voted to abandon PRAS because it had not achieved the intended noise abatement.[17] Phase 3 of the BLANS focused on updating the Runway Use Program. Operational tests of a new program began in November 2014 and continued through September 2016. The BLANS project ended in 2016 without the Logan Airport CAC agreeing on a new Runway Use Program. A final BLANS project report was issued in April 2017.

Table 6-6 provides the original PRAS goals and a comparison of effective runway use[18] from 2016 to 2019. Massport also continues to collect and report data pertaining to PRAS's second objective: relief from continuous operations over the same neighborhoods at the ends of the runways. The section of this chapter titled "Dwell and Persistence Reduction" presents that data.

17 BLANS Level 3 Screening Analysis, FAA, December 2012, Page E-2.

18 Effective Runway use refers to runway use which applies a factor of 10 to the night operations, similar to DNL.

Table 6-6 Effective Jet Aircraft Runway Use in Comparison to Preferential Runway Advisory System (PRAS) Goals

	PRAS Effective Usage Goals		2016 Effective Usage		2017 Effective Usage		2018 Effective Usage		2019 Effective Usage	
Runway End	**ARR**	**DEP**	**ARR**	**DEP**	**ARR**	**DEP**	**ARR**	**DEP**	**ARR**	**DEP**
4R/4L	21.1%	5.6%	26.4%	3.8%	18.2%	1.7%	26.3%	3.3%	24.0%	3.3%
9	0.0%	13.3%	0.0%	23.9%	0.0%	19.2%	0.0%	23.5%	0.0%	23.6%
15R	8.4%	23.3%	0.7%	12.6%	3.7%	11.0%	0.2%	10.5%	0.3%	9.2%
22L/22R	6.5%	28.0%	28.0%	26.4%	24.3%	24.7%	38.5%	35.3%	35.5%	30.3%
27	21.7%	17.9%	20.4%	16.2%	25.9%	20.3%	16.1%	12.8%	18.3%	15.5%
33L	42.3%	11.9%	24.0%	17.0%	27.1%	23.0%	18.3%	14.6%	21.3%	18.1%
14[1]	N/A	N/A	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
32[1]	N/A	N/A	0.6%	0.0%	0.7%	0.0%	0.5%	0.0%	0.7%	0.0%

Source: Massport Noise Office and HMMH, 2020.
Notes: PRAS goals are stated in terms of effective jet operations which exclude non-jet flights, but which multiply each nighttime (10:00 PM to 7:00 AM) operation by a factor of 10.
N/A Not available.
1 Runway 14-32 opened following the suspension of PRAS; consequently, PRAS goals were not established for this runway.

Flight Tracks

As described in the *Noise Modeling Process* section of this chapter, a data pre-processor imports data into AEDT. Instead of using representative model flight tracks, the AEDT pre-processor converts each radar track to an AEDT model track and then models the scaled operation on that track.[19] Appendix H, *Noise Abatement,* provides more information about this pre-processor. This allows Massport to account for runway closures and/or temporary or permanent airspace changes that occur during the year, events which would be much more difficult to accurately capture with conventional modeling methods.

For this *2018/2019 EDR*, 416,992 flight tracks were modeled to calculate the noise levels surrounding Logan Airport for calendar year 2018, and 410,663 flight tracks were modeled for 2019. **Figures 6-4** through **6-10** provide examples of flight tracks used in AEDT to develop the DNL contours.[20] The figures show arrivals and departures throughout each year from a representative sample for each of three aircraft categories: air carrier jets, RJs, and non-jets. Different colors were used to plot the tracks from 2018 and 2019; as shown by the figures, the flight corridors for the two years are very similar.

By 2011, the implementation of RNAV departure and arrival procedures from the BLANS was completed. In addition to the RNAV procedures recommended from the BLANS study, other RNAV procedures implemented

19 This method provides a one to-one correspondence of radar tracks to model tracks and ensures that the lateral and vertical dispersion of aircraft types are consistent with the radar data.

20 The flight tracks shown in these figures are a representative sample, selected uniformly from the complete track set to match the overall annual runway use.

at Logan Airport (such as the RNAV arrivals into the terminal airspace) are part of a national FAA initiative, which is being implemented to improve safety and efficiency in the airspace system. These procedures result in consolidated flight paths and greater predictability along the flight route. Similar procedures have been implemented at Denver, Minneapolis, Baltimore-Washington, Houston, Dallas, Chicago Midway, Phoenix, and Seattle Airports.

- **Figure 6-4** displays air carrier jet departures following the FAA RNAV departure procedures.
- **Figure 6-5** displays air carrier jet arrivals. The RNAV arrival procedures are very evident in the 2018 and 2019 modeled data, with a narrowing of the flight tracks into concentrated areas.
- **Figure 6-6** displays the RJ departures following the RNAV departure routes in the same manner as the larger air carrier jets.
- **Figure 6-7** displays the RJ arrivals, again resembling the patterns of the larger air carrier jets.
- **Figure 6-8** displays the non-jet departures. Non-jet aircraft tend to turn early off the runways, not following the jet departure routes. Non-jet departures from Runways 4L, 22R, 33L, and 27 are allowed to turn over residential areas, whereas the jet aircraft are not. This also keeps the non-jet aircraft out of the jet departure paths, allowing for efficient jet departures.
- **Figure 6-9** displays the non-jet arrivals. The Boston Harbor route for non-jet aircraft arriving to Runway 4L can be clearly seen. The graphic shows that non-jet arrivals use Runways 22R and 33R, which are not used by jets. Non-jet arrivals also use the other runways which do accommodate jets.
- **Figure 6-10** displays the night jet arrivals using the Light Visual Approach[21] to Runway 33L. This is a procedure developed from the BLANS project, which is available only during visual conditions at night in which pilots can follow a route offshore to reduce noise impacts. These flights remain offshore and avoid overflying Cohasset and Hull at night. Flights arriving to Runway 33L from the west pass over Saugus and Nahant at a higher altitude and then head south over Boston Harbor to intersect with the visual approach procedure. Of the 7,793 nighttime arrivals to Runway 33L in 2018, approximately 300 used this procedure and of the 9,144 nighttime arrivals to Runway 33L in 2019, approximately 100 used this procedure. An RNAV visual approach procedure[22] developed by jetBlue Airways coincides with the final portion of the route of the Light visual approach. The RNAV visual approach procedure gives aircraft with advanced navigational capabilities a predictable approach to Runway 33L in visual conditions. This procedure, seen in the concentrated approach path in **Figure 6-10,** is now available to authorized airlines only.

Meteorological Data

AEDT has several settings that reflect aircraft performance profiles and sound propagation based on meteorological data. Meteorological settings include average temperature, dew point, barometric pressure, and relative humidity at the Airport. FAA requires using the multiyear average data provided with the AEDT model. However, since the noise results represent an individual year, Massport obtained concurrence from FAA to use data for that specific year (see Appendix H, *Noise Abatement)*. Massport obtained weather data for 2018 and 2019 from the National Climatic Data Center and used the respective annual averages in modeling all 2018 and 2019 operations.

21 A Visual Approach procedure can only be used when weather conditions permit, and the pilots follow visual landmarks to follow the procedure.

22 Boston Logan Runway 33 Left Area Navigation (RNAV) Visual Flight Procedure Test CATEX, approved June 26, 2013.

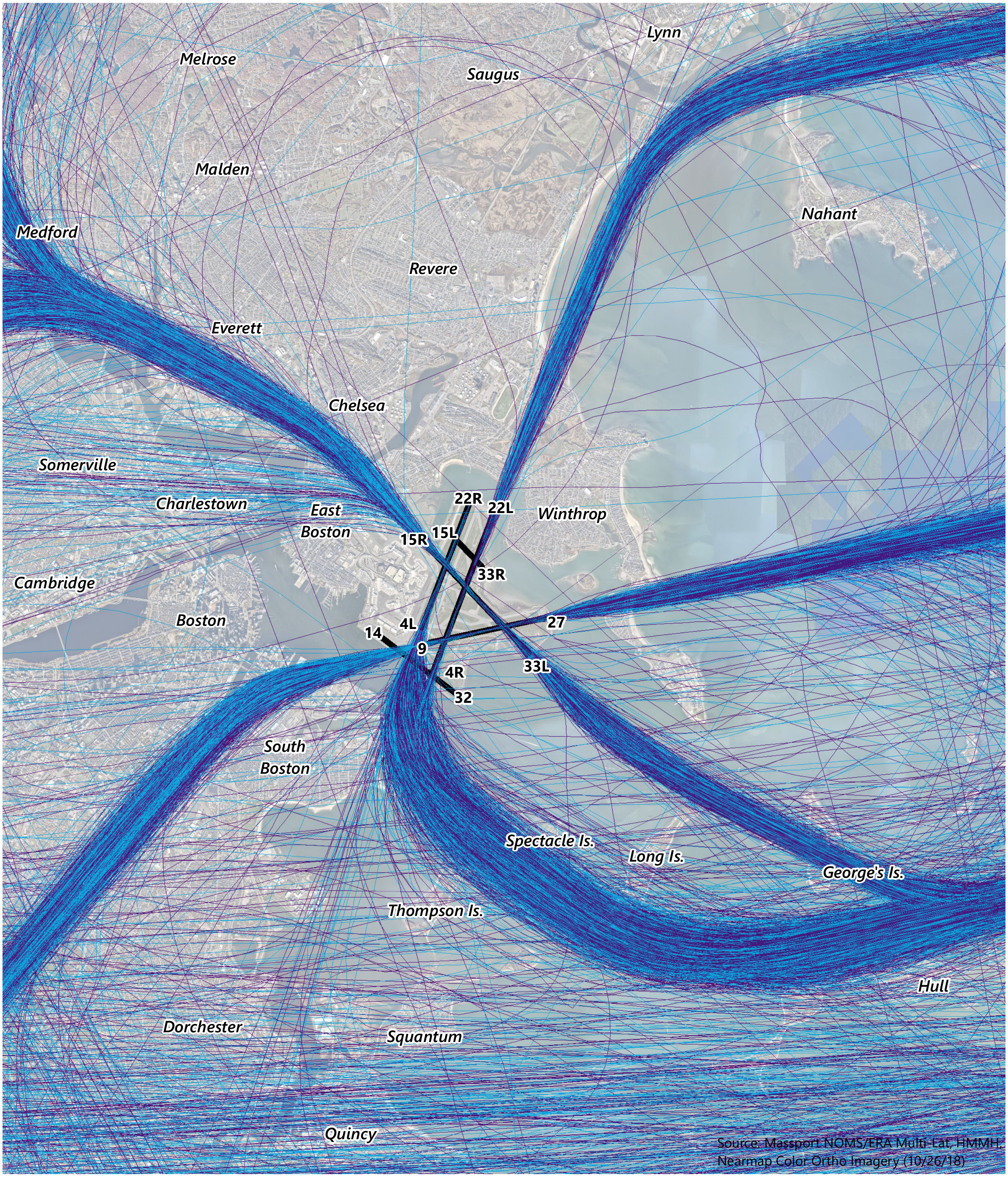


FIGURE 6-4 Air Carrier Departure Flight Tracks

2018/2019 Environmental Data Report

2018 Air Carrier Jet Departures

2019 Air Carrier Jet Departures

0 0.5 1 2 Miles

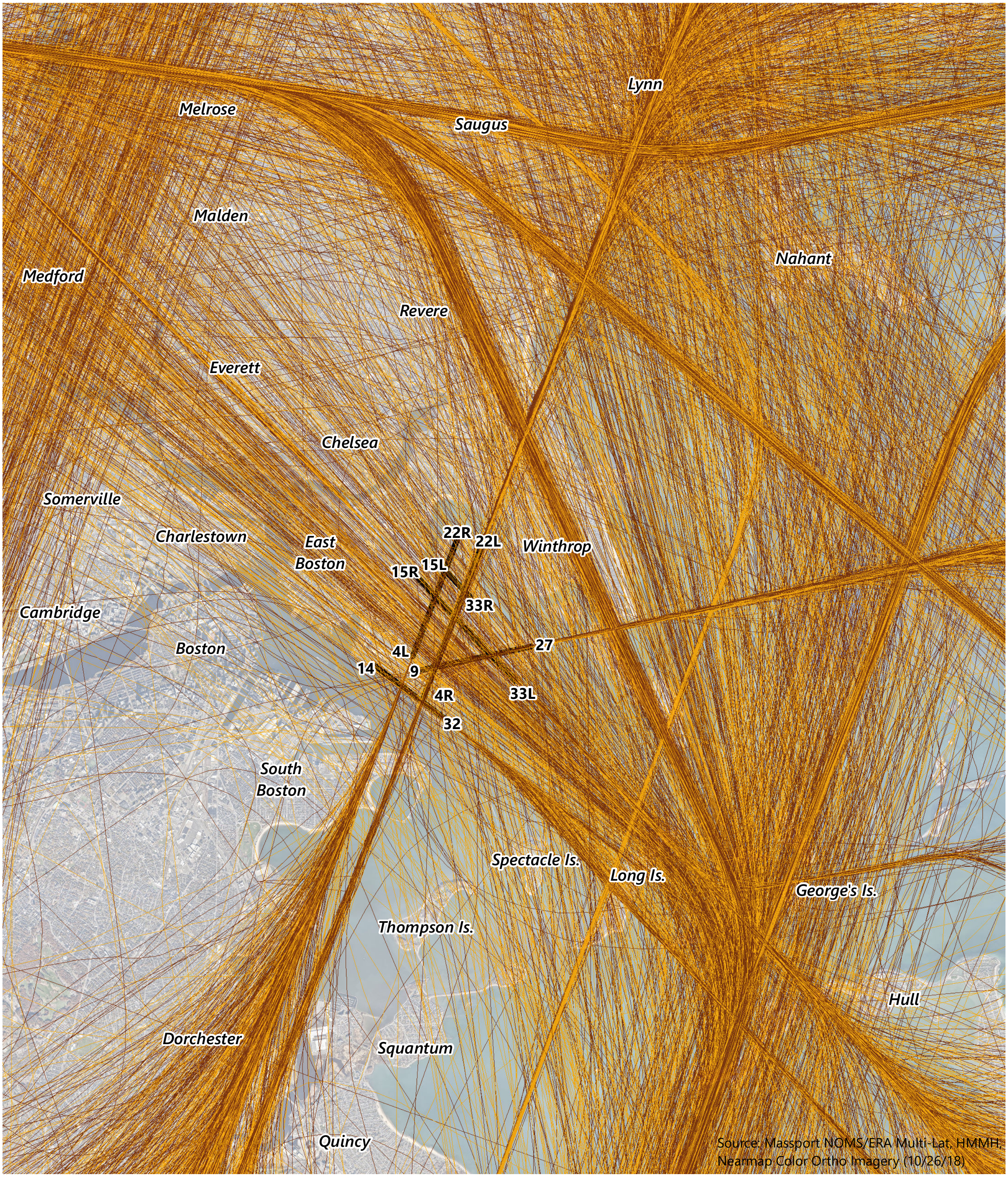


FIGURE 6-5 Air Carrier Arrival Flight Tracks

2018/2019 Environmental Data Report

2018 Air Carrier Jet Arrivals

2019 Air Carrier Jet Arrivals

0 0.5 1 2 Miles

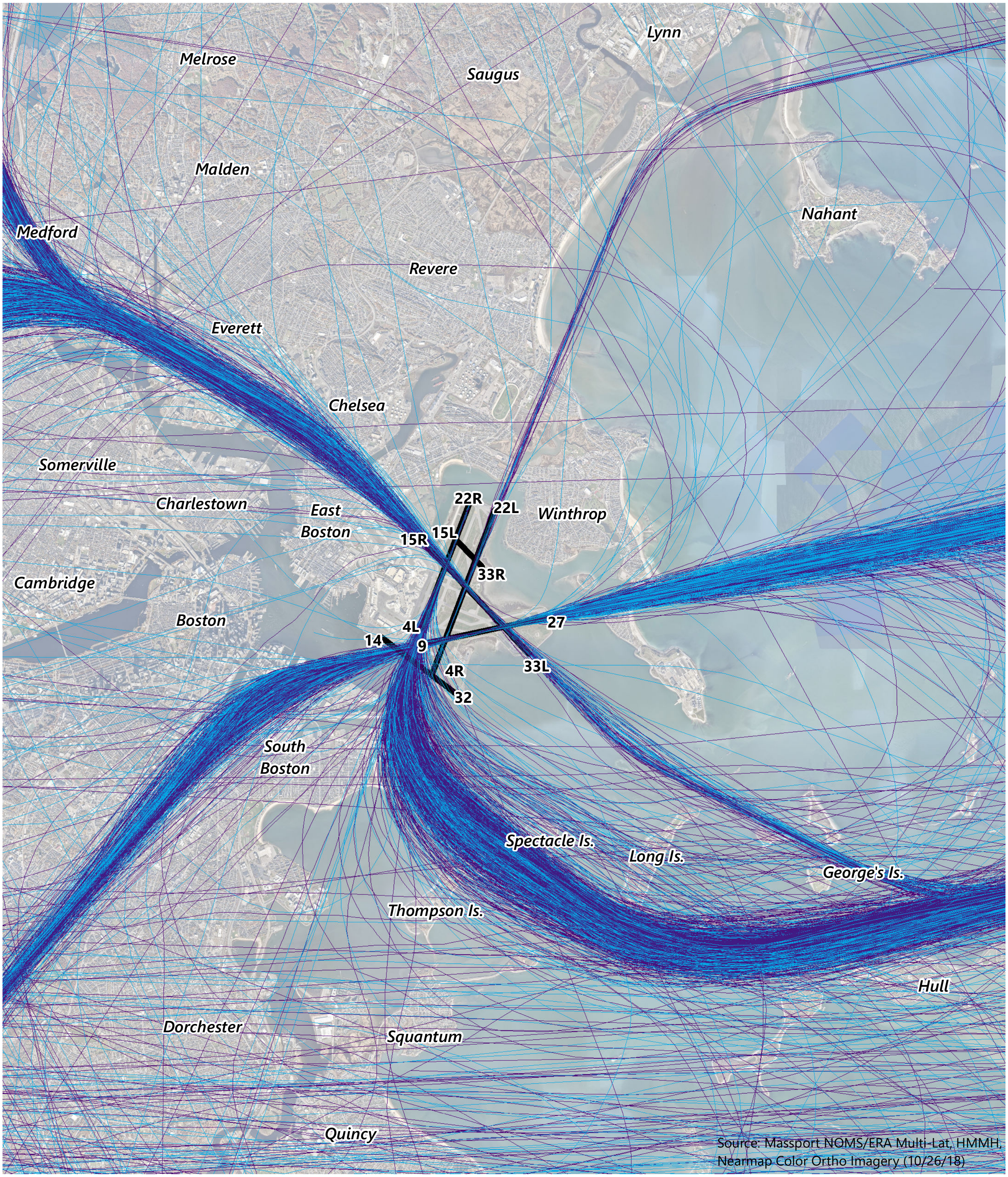


FIGURE 6-6 Regional Jet Departure Flight Tracks

2018/2019 Environmental Data Report

2018 Regional Jet Departures

2019 Regional Jet Departures

0 0.5 1 2 Miles

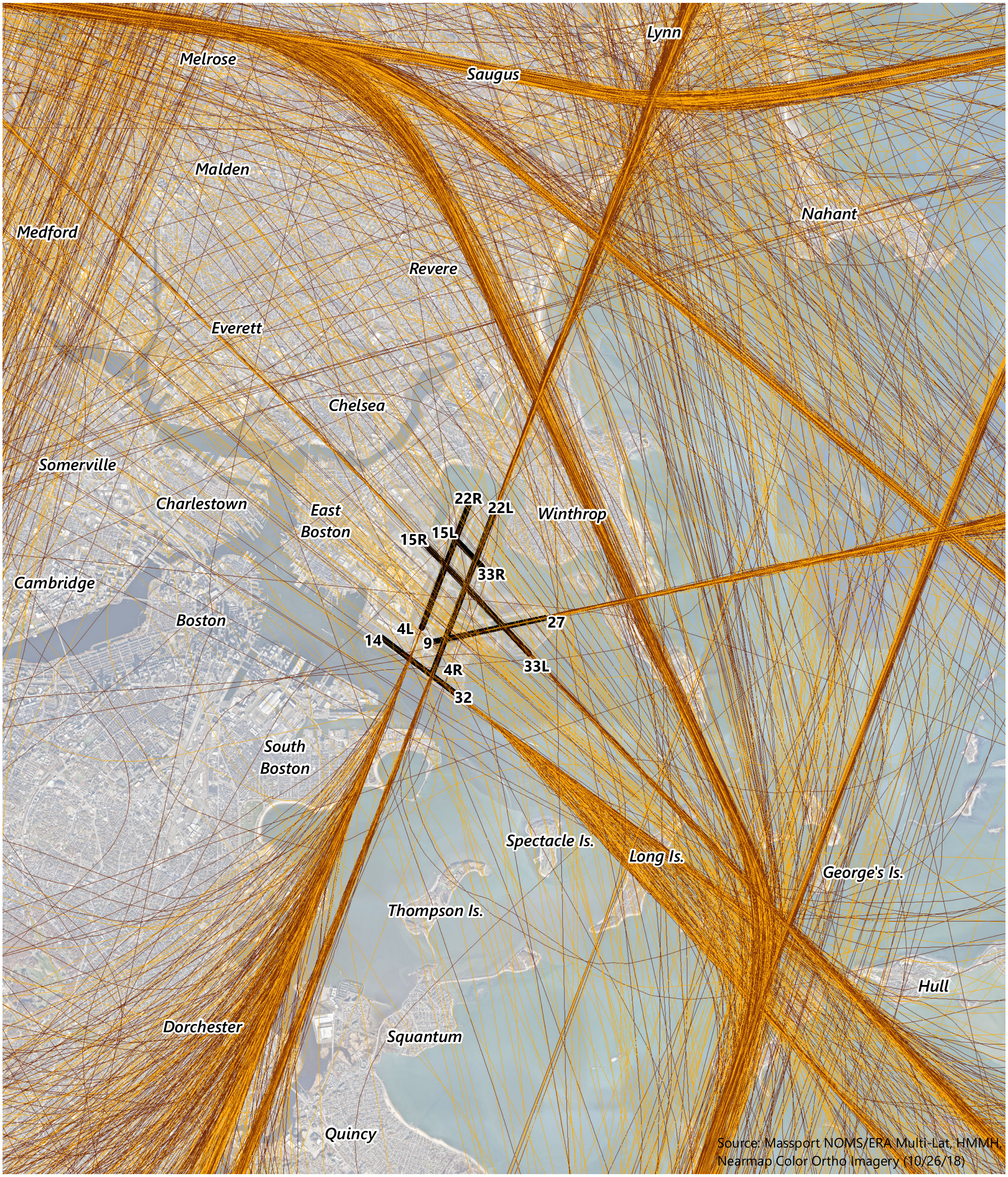


FIGURE 6-7 Regional Jet Arrival Flight Tracks

2018 Regional Jet Arrivals

2019 Regional Jet Arrivals

0 0.5 1 2 Miles

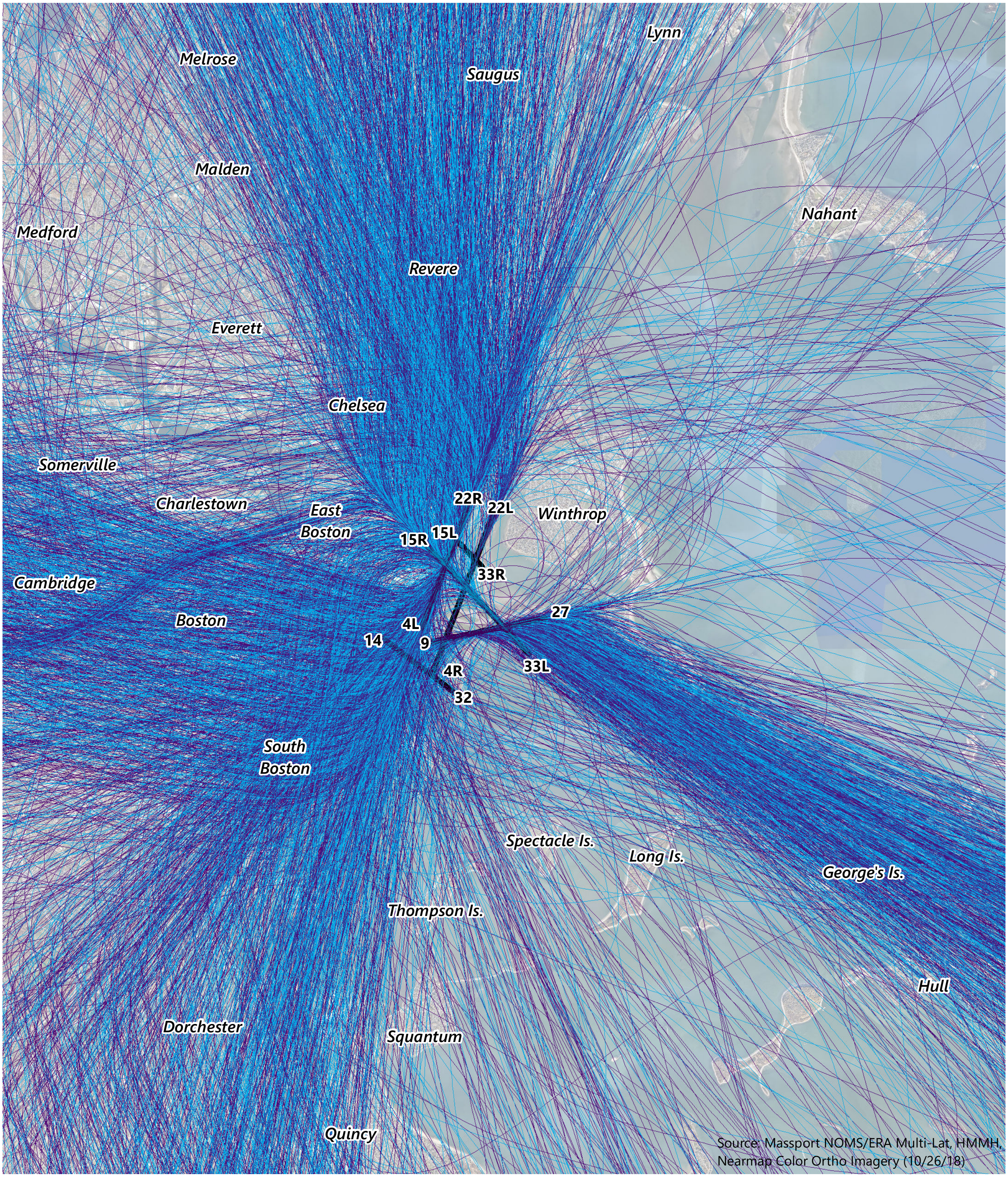


FIGURE 6-8 Non-Jet Departure Flight Tracks

2018/2019 Environmental Data Report

2018 Non-Jet Departures

2019 Non-Jet Departures

Note: Non-jet tracks are non-RNAV.

0 0.5 1 2 Miles

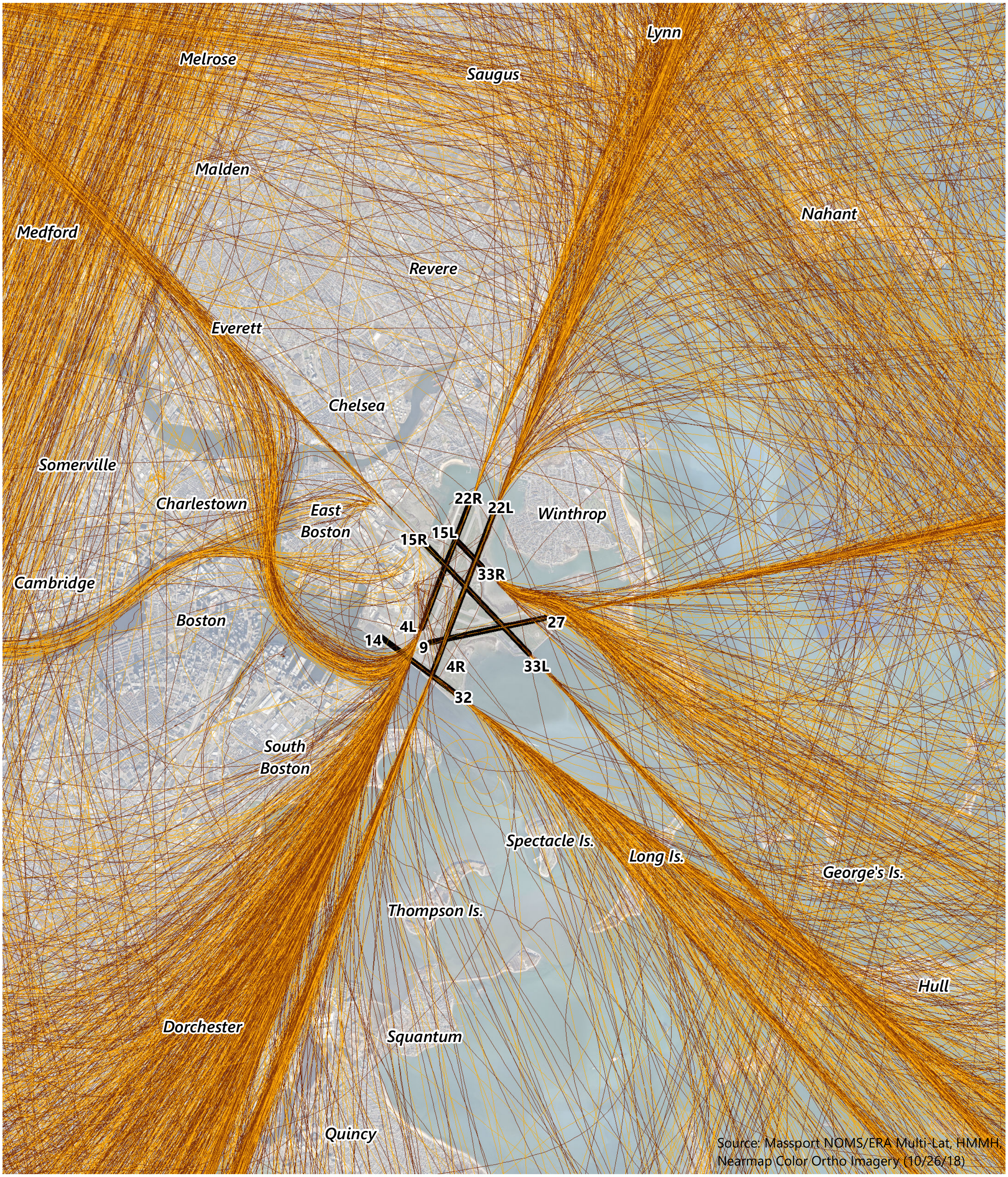


FIGURE 6-9 Non-Jet Arrival Flight Tracks

2018/2019 Environmental Data Report

2018 Non-Jet Arrivals

2019 Non-Jet Arrivals

Note: Non-jet tracks are non-RNAV.

0 0.5 1 2 Miles

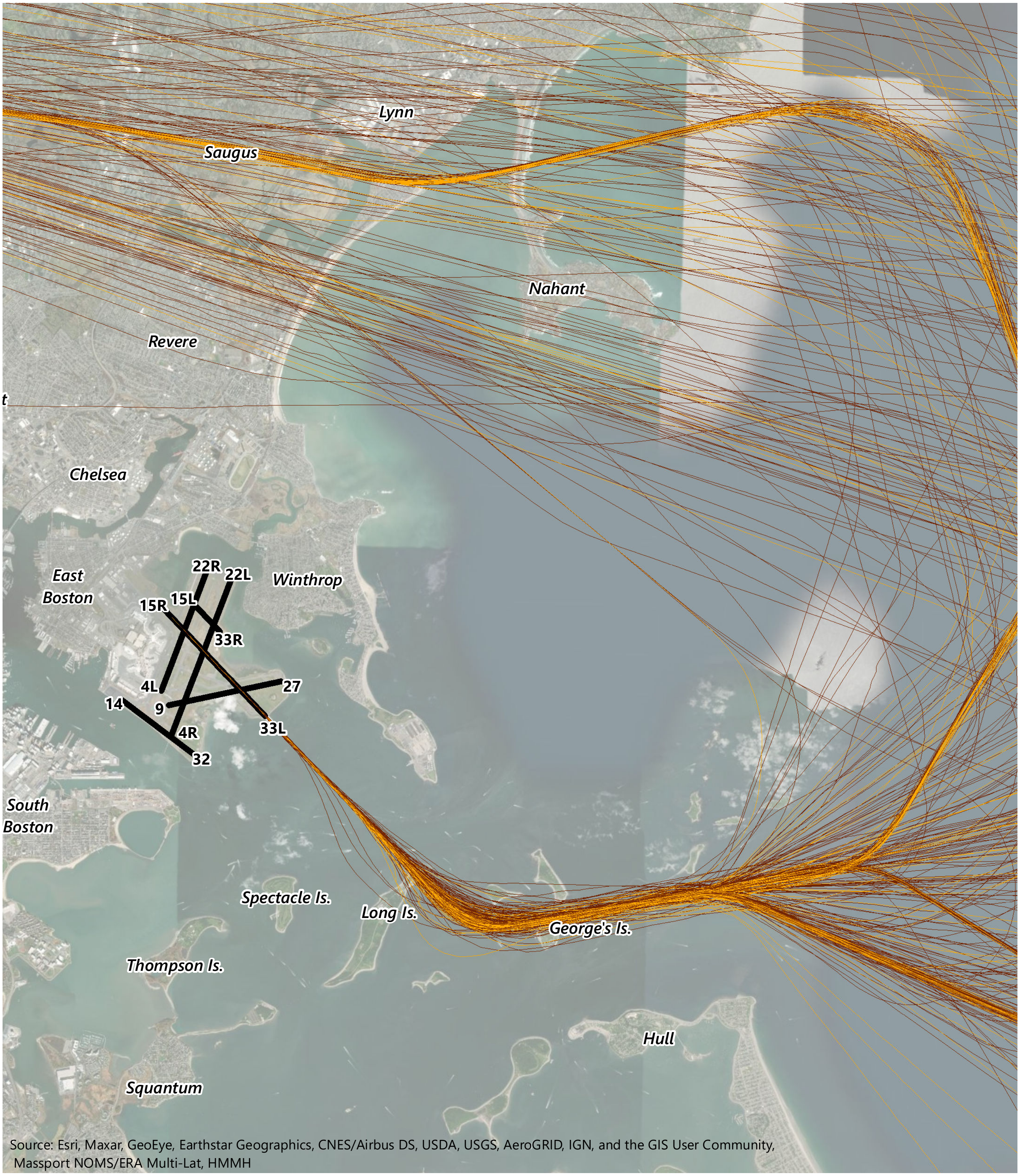


FIGURE 6-10 Runway 33L Night (10PM - 7AM) Light Visual Approach Arrival Flight Tracks

2018/2019 Environmental Data Report

2018 Light Visual Approach Arrivals

2019 Light Visual Approach Arrivals

0 0.5 1 2 Miles

Noise Levels in 2018 and 2019

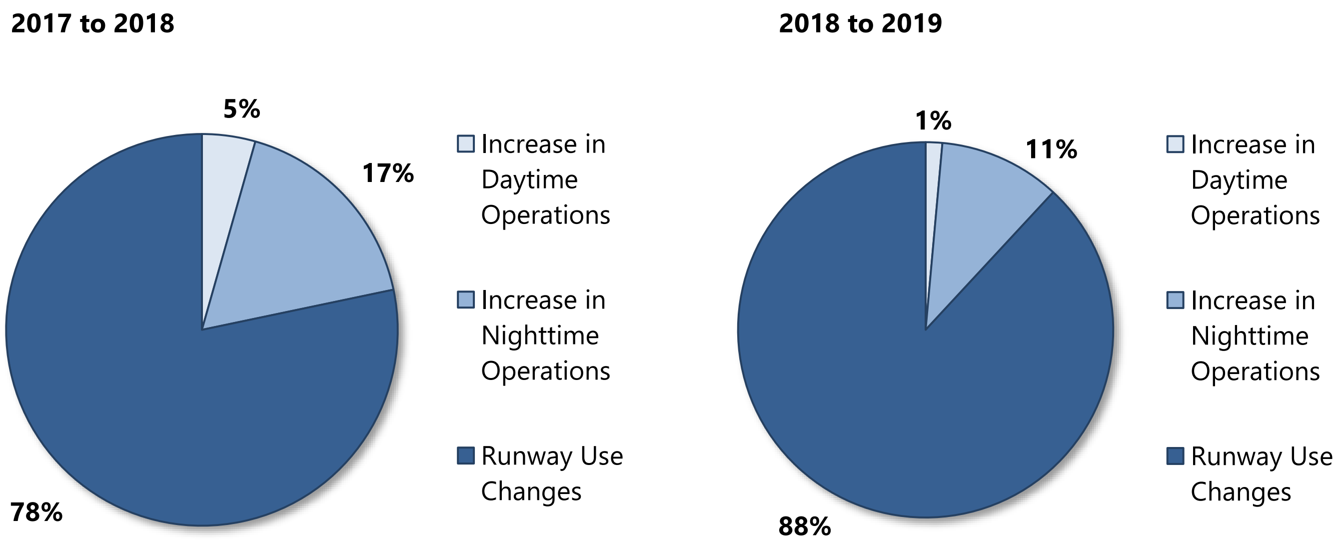
The following section describes the results of noise modeling in AEDT for 2018 and 2019. The DNL contours are presented graphically, the population living within contour intervals are tabulated, and DNL values computed by the model for the specific noise monitor locations are compared to the measured noise levels. Historical data are also provided for context. DNL 65 dB is the focus of much of the noise analysis, as it is the threshold for noise incompatibility with residential land use,[23,24] for both FAA and the U.S. Department of Housing and Urban Development.

Day-Night Noise Contours for 2018 and 2019

The 2018 and 2019 DNL contours were prepared using the most recent version of FAA's AEDT model, version 3c. Massport transitioned to the AEDT model from the INM in its *2016 EDR*. That document provides detailed analyses of the differences in the INM and AEDT models and the resultant DNL contours for Logan Airport. This EDR is the third annual document containing DNL contours developed in AEDT.[25]

Compared to 2017, aircraft operations at Logan Airport in 2018 and 2019 were different in overall proportion of nighttime operations, and runway use. **Figure 6-11** shows the relative influence of these factors on changes in the noise contour.

Figure 6-11 **Reason for Changes in Number of People Exposed to Day-Night Average Sound Level (DNL) Values Greater than or Equal to 65 dB (2017 to 2018 and 2018 to 2019)**



Source: HMMH, 2020.

23 14 Code of Federal Regulations Part 150, Appendix A to Part 150 Noise Exposure Maps, Sec. A150.101(d)).

24 24 Code of Federal Regulations Part 51, Subpart B Noise Abatement and Control, Sec. 51.103(c)).

25 The 2016 Day-Night Average Sound Level (DNL) contours were developed in Aviation Environmental Design Tool (AEDT) 2c SP2 and the 2017 DNL contours were developed with AEDT 2d. The 2018 and 2019 contours were developed with AEDT 3c. Appendix H contains details regarding the changes included in the AEDT upgrades.

Figure 6-12 shows DNL 65 dB contours for 2018 and 2017, both modeled with the AEDT software. The overall shape of the 2018 contours is similar to 2017 conditions, with differences mainly attributable to runway use shifts. The overall increase in the size of the contour reflects the 5.6 percent increase in operations from 2017 to 2018. As noted in the discussion of **Tables 6-1** and **6-4**, overall daytime operations in 2018 increased by 4.6 percent from 2016, while nighttime operations increased by 11.3 percent. Because of the 10 dB weighting assigned to nighttime operations in the calculation of DNL, nighttime changes have a more pronounced effect on the DNL contours than daytime changes.

The other main factors influencing the 2018 noise contours are the shifts in effective runway use (summarized in **Table 6-6**). As noted previously in this chapter in the discussion of runway use, Runway 4R-22L was closed for a 35-day period in May and June 2017 and then had limited availability for Runway 4R arrivals into September 2017. This closure and its effect on the annual runway usage rates is a major factor in the observed changes in the shape of the DNL contours between 2017 and 2018.

The following list describes the changes that can be seen in **Figure 6-12** and relates each change to its most direct cause. The list begins at the "twelve o'clock" position and proceeds clockwise around the Airport.

- Directly north of the Airport, increased departures from Runway 22R in 2018 (as compared to 2017, with its extended Runway 4R-22L closure) resulted in a slightly larger curved bulge in the contour from start of takeoff roll south of Orient Heights. The long lobe of the contour reaching northward through Revere was slightly wider for 2018, and it extended further past the shoreline, due to increased Runway 22L arrivals. Departures from Runway 4R also overfly this area and increased in 2018. Alongside Runway 22L, near the Chelsea Point area of Winthrop, the 2018 contour is slightly wider in 2018 due to sideline noise from increased Runway 22L departures.
- The lobe extending eastward over the Point Shirley area of Winthrop is somewhat shorter over the water in 2018 as compared to 2017 due to decreased Runway 27 arrivals, and slightly wider over the populated peninsula due to increased Runway 9 departures.
- The lobe extending southeast over the unpopulated Boston Harbor Islands was shorter in 2018 than in 2017 due to decreased Runway 33L arrivals after Runway 4R-22L resumed normal operation.
- The lobe of the contour extending south over the Castle Island/Pleasure Bay area of South Boston is larger for 2018 than for 2017 due to the combined effects of increases in Runway 4R arrivals and increases in Runway 22L departures after Runway 4R-22L resumed normal operation. There is no population living within this part of the DNL 65 dB contour.
- The bump out in the contour on the southwest side of the Airport is smaller in 2018 than in 2017 due to decreased Runway 27 departures. There is no population living within this part of the DNL 65 dB contour.
- The contour lobe extending northwest over the Eagle Hill section of East Boston, towards Chelsea, is smaller in 2018 than in 2017 due to the combined effects of decreased Runway 15R arrivals and decreased Runway 33L departures after Runway 4R-22L resumed normal operation. The 2018 contour does not reach into Chelsea at all.

FIGURE 6-12 Comparison between 2017 and 2018 DNL 65 dB Contours

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2017 DNL Contour (AEDT 2d)
2018 DNL Contour (AEDT 3c)
Sound Insulation Areas

0 1750 3500 7000 Feet

Figure 6-13 shows DNL 65 dB contours for 2019 and 2018, both modeled with the same version of AEDT software. The overall shape of the 2019 contours is very similar to 2018 conditions, once again with differences mainly attributable to runway use shifts.

From 2018 to 2019, operations in almost every category increased, but less noticeably than the growth seen in the previous year. A less than 1-percent increase in operations from 2018 to 2019 and a small increase in the percentage of nighttime operations (as noted in the discussion of **Tables 6-1** and **6-4**) results in a small increase in the overall size of the contour. As noted previously, because of the 10 dB weighting assigned to nighttime operations in the calculation of DNL, nighttime changes have a more pronounced effect on the DNL contours than daytime changes.

Runway use shifts from 2018 to 2019, although less pronounced than the 2017 to 2018 shifts, are again largely responsible for the observable contour changes, as described in the following list. An increase in northwest winds in 2019 resulted in higher use of Runways 27, 32, and 33L and less use of Runways 4L, 4R, 9, 22L, and 22R. Each change is attributed to its most direct cause. The list begins at the "twelve o'clock" position and proceeds clockwise around the Airport.

- Directly north of the Airport, the curved bulge in the contour near Orient Heights that is created behind aircraft departing from Runway 22R retracts almost imperceptibly in 2019 from its 2018 position, in response to decreases in those operations. The long lobe of the contour reaching northward through Revere, which widened and lengthened for 2018, retracted slightly at the tip for 2019, due to a small decrease in Runway 22L arrivals. Departures from Runway 4R, which increased in 2018, remained at about the same level in 2019.
- The lobe extending eastward over the Point Shirley area of Winthrop, which shortened over the water for 2018 as compared to 2017, lengthened again a small amount from 2018 to 2019 and widened marginally over the populated peninsula due to an increase in Runway 27 arrivals. Runway 9 departure rates remained about the same from 2018 to 2019.
- The lobe extending southeast over the unpopulated Boston Harbor Islands which shortened for 2018 in comparison to 2017, re-extended for 2019 as the effective usage rate for Runway 33L arrivals increased slightly. The lengthened 2019 contour is still shorter than the 2017 contour.
- To the south of the Airport, the lobe of the contour extending south over the Castle Island/Pleasure Bay area of South Boston retracted slightly from 2018 to 2019 due to small decreases in both Runway 4R arrivals and Runway 22L departures. There is no population living within this part of the DNL 65 dB contour.
- The bump out in the contour on the southwest side of the Airport re-extended from 2018 to 2019 (after its 2017 to 2018 retraction) due to increased Runway 27 departures. There is no population living within this part of the DNL 65 dB contour.
- The contour lobe extending northwest over the Eagle Hill section of East Boston towards Chelsea, also re-extended from 2018 to 2019 after a 2017 to 2018 retraction. The usage of Runway 15R for arrivals stayed about the same from 2018 to 2019. An increase in Runway 33L departures pushed the 2019 DNL 65 dB contour back toward its 2017 extents, but not quite into populated areas of Chelsea.

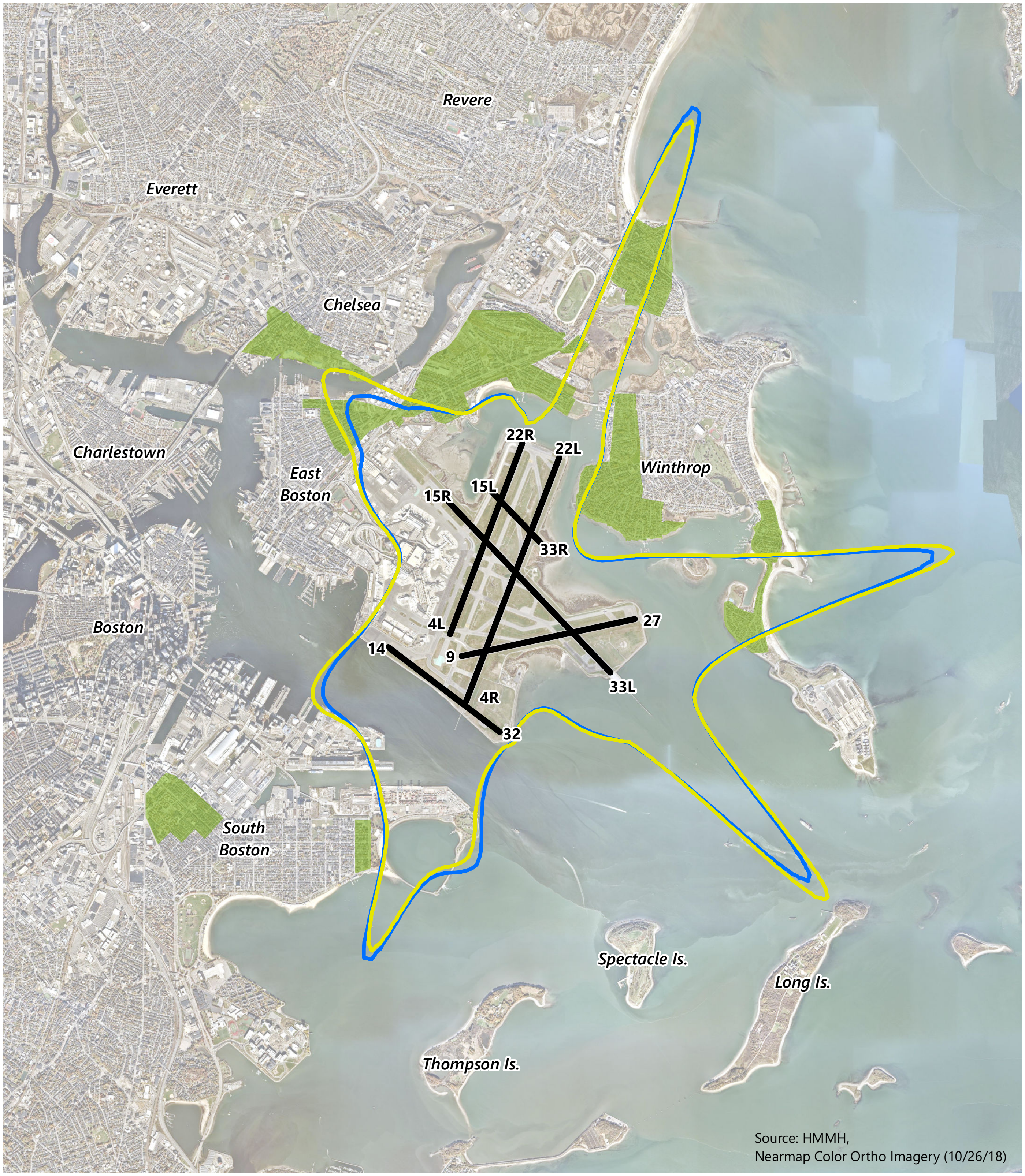

FIGURE 6-13 Comparison between 2018 and 2019 DNL 65 dB Contours

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Figure 6-14 displays the complete DNL contour set for 2018 and **Figure 6-15** displays the complete DNL contour set for 2019.

There is a demonstrated long-term trend of noise level reduction at Logan Airport due to efforts by Massport, airlines, and the FAA, and due to improvements in engine technologies such as the nationwide phaseout of Stage 2 operations in 1999 and today's requirements that newly certificated aircraft meet Stage 5 noise levels. **Figure 6-16** presents the DNL 65 dB noise contours from 1990, 2018, and 2019.

Population Impact Assessment

Massport reports population counts within selected 5 dB increments of exposure each year to indicate how Logan Airport's noise environment changes over time. **Table 6-7** shows population counts for 2018 and 2019 by noise level and by community, compared to previous years. The 2010 U.S. Census data form the basis of the population counts for 2010 and later. Population counts from 2000 through 2009 are based on U.S. Census data for 2000. Future years will use the 2020 Census (when available) as a baseline.

As noted in the *2017 ESPR*, the method for calculating population impact was refined for the 2017 analysis. Historically, the population calculations were developed by the noise model (AEDT or INM) or by GIS software by adding the populations of U.S. Census blocks within each contour level. A block was considered to be within the contour if the center location (or centroid) was within the DNL contour. The weakness of that method arises from the fact that the population of a U.S. Census block is distributed throughout the block, not clustered at its centroid. Blocks on the edge of the contour were either entirely included or entirely excluded from the count, but in reality, some fraction of the block's population resides within the contour.

The updated method (adopted for the *2017 ESPR* and continued for the contours included in this *2018/2019 EDR*) determines the fraction of the area of the U.S. Census block that is within the contour and multiplies the block population by this fraction to determine the noise-exposed population for that block. This more accurately represents the included population within U.S. Census blocks that are on the DNL contour boundary. This proportional method, while still an approximation, also better addresses the more obscure problem of oddly shaped blocks whose centroid is outside the block boundary.

When comparing population impact assessment across multiple years, it should be noted that the population estimation is affected by the noise model used to create the contours. As discussed in the *2016 EDR*, AEDT-modeled contours are smaller than the INM-modeled contours, which included FAA-approved over-water effects, hill effects, and custom altitude profiles. Consequently, population calculations based on AEDT contours result in smaller exposed populations. **Table 6-7** provides population results for the contour set for each given year, with the model noted.

On the preceding pages, the discussions of the comparisons of consecutive years' DNL 65 dB contours (from 2017 to 2018 as shown in **Figure 6-12** and from 2018 to 2019 as shown in **Figure 6-13**) detail the contour changes over the various populated neighborhoods. The population changes seen in **Table 6-7** reflect those contour changes.

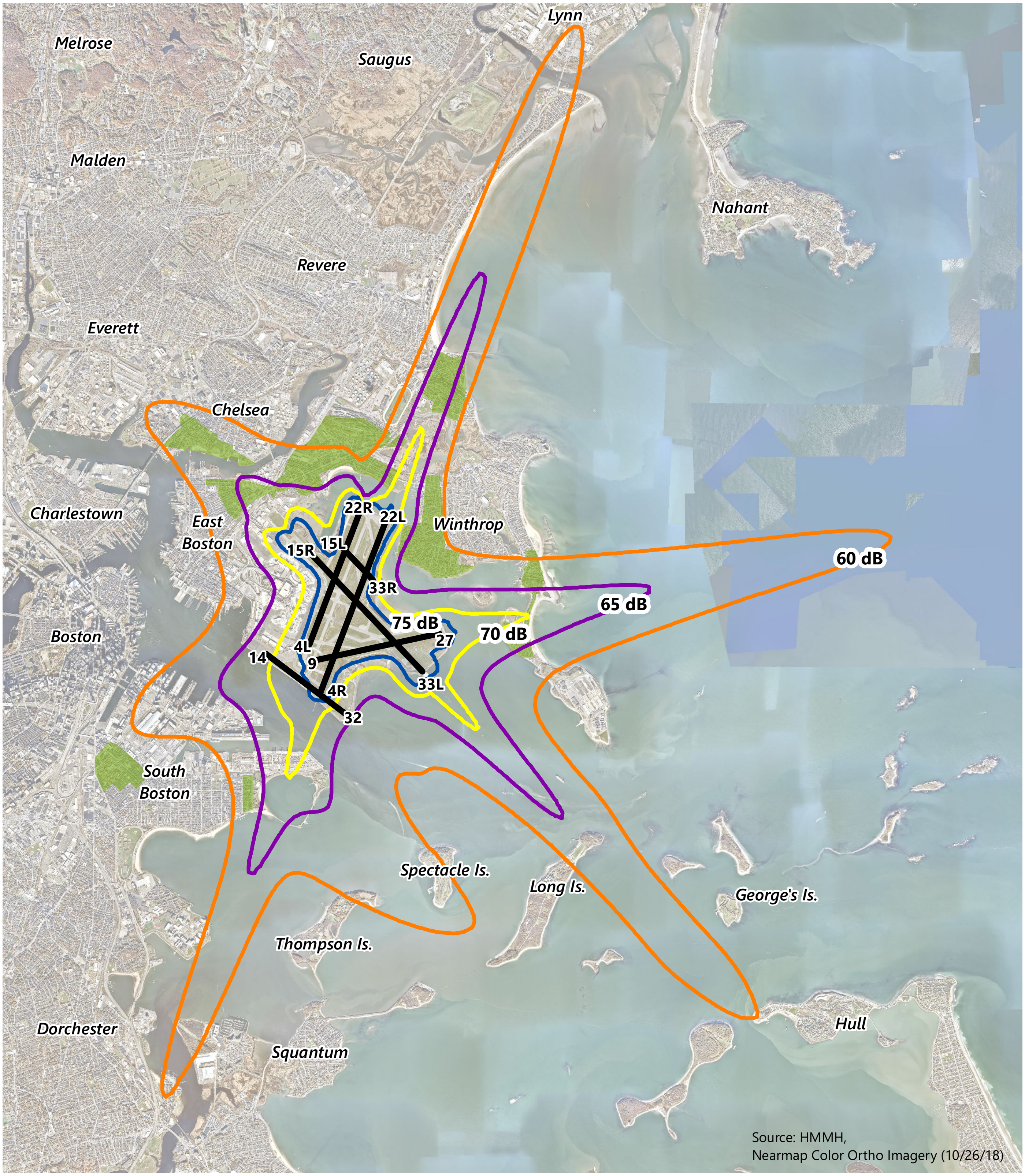

FIGURE 6-14 **60-75 DNL Contours for 2018 Operations Using AEDT 3c**

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2018 DNL Contour (AEDT 3c)

- 60 dB
- 65 dB
- 70 dB
- 75 dB
- Massport Sound Insulation Areas

0 1750 3500 7000 Feet

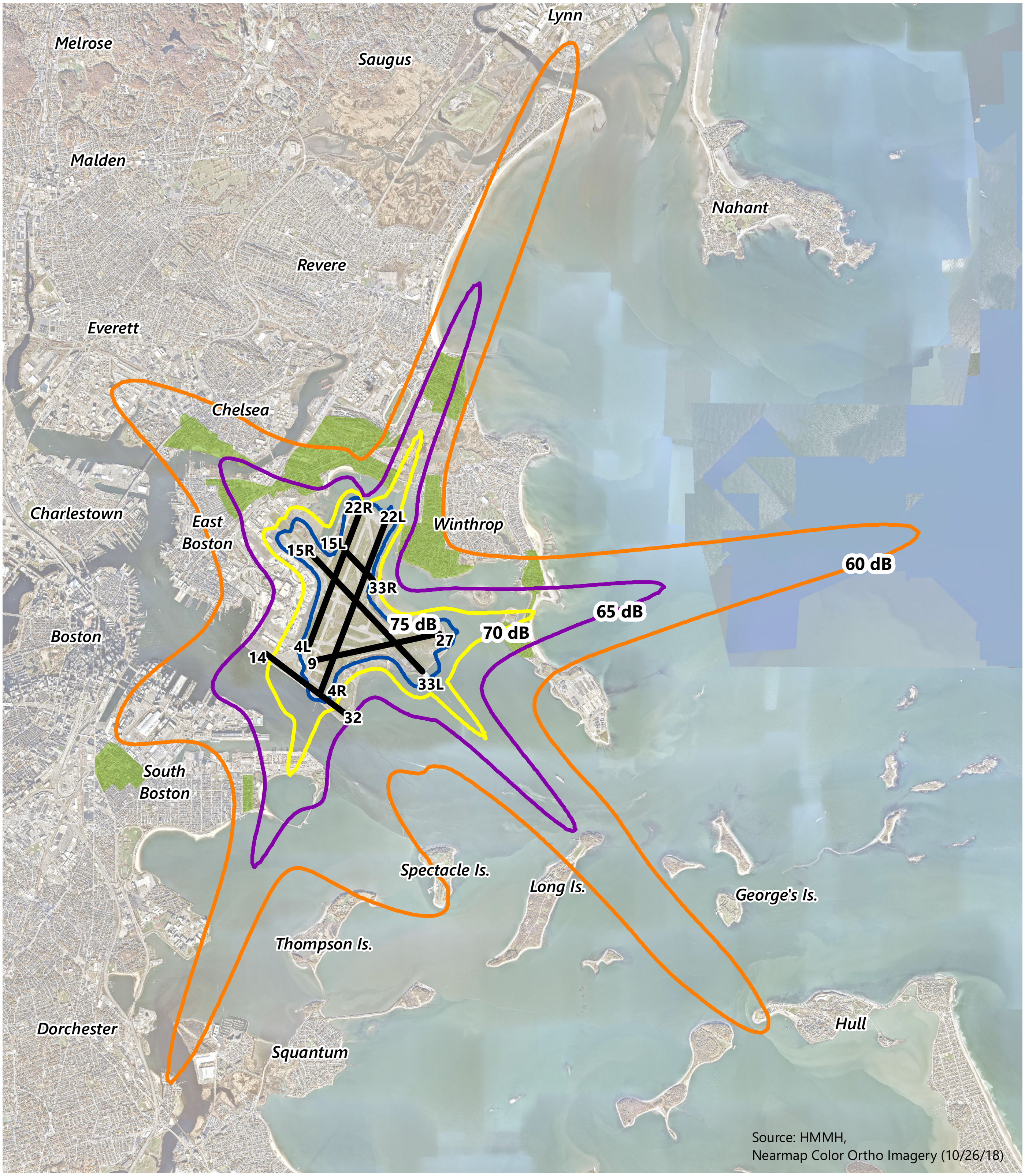


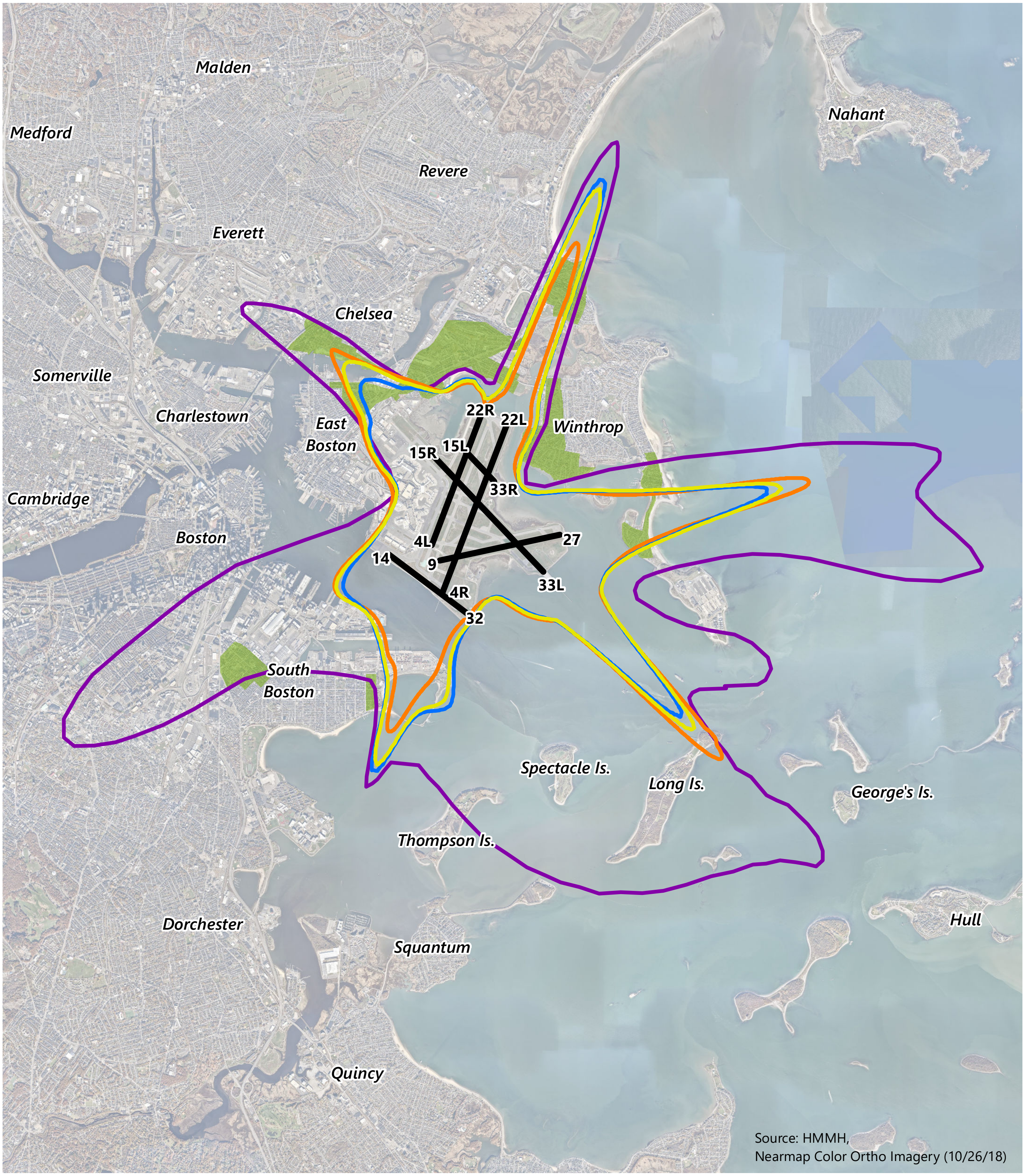
FIGURE 6-15 60-75 DNL Contours for 2019 Operations Using AEDT 3c

2018/2019 Environmental Data Report

2019 DNL Contour (AEDT 3c)

60 dB
65 dB
70 dB
75 dB
Massport Sound Insulation Areas

0 1750 3500 7000 Feet



Source: HMMH,
Nearmap Color Ortho Imagery (10/26/18)

FIGURE 6-16 Comparison between 1990, 2017, 2018, and 2019 DNL 65 dB Contours

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1990 DNL Contour (INM)
2017 DNL Contour (AEDT 2d)
2018 DNL Contour (AEDT 3c)
2019 DNL Contour (AEDT 3c)
Sound Insulation Areas

0 1750 3500 7000 Feet

Table 6-7 Noise-Exposed Population by Community[1]

Year	> 75 DNL	70-75 DNL	65[3]-70 DNL	Total (65+)[3] DNL	Year	> 75 DNL	70-75 DNL	65[3]-70 DNL	Total (65+)[3] DNL
Boston					**Revere**				
1990	0	1,778	28,970	30,748	1990	0	0	4,274	4,274
2000	0	234	9,014[2]	9,248[2]	2000	0	0	2,496	2,496
2010	0	0	689[2]	689[2]	2010	0	0	2,413	2,413
2015	0	110	7,255[2]	7,365[2]	2015	0	0	3,789	3,789
2016	0	0	4,031	4,031	2016	0	0	2,376	2,376
2017	0	14	4,720	4,734	2017	0	0	2,362	2,362
2018	0	11	2,228	2,239	2018	0	0	3,574	3,574
2019	0	7	4,029	4,036	2019	0	0	3,484	3,484
Chelsea					**Winthrop**				
1990	0	0	4,813	4,813	1990	676	1,211	2,420	4,307
2000	0	0	0	0	2000	247	1,070	4,684	6,001
2010	0	0	0	0	2010	0	130	598	728
2015	0	0	0	0	2015	0	320	2,623	2,943
2016	0	0	0	0	2016	0	130	913	1,043
2017	0	0	65	65	2017	0	125	647	772
2018	0	0	0	0	2018	0	51	1,170	1,221
2019	0	0	0	0	2019	0	96	1,152	1,248
Everett					**All Communities**				
1990	0	0	0	0	1990	676	2,989	40,477	44,142
2000	0	0	0	0	2000	247	1,304	16,194	17,745
2010	0	0	0	0	2010	0	130	3,700	3,830
2015	0	0	0	0	2015	0	430	13,667	14,097
2016	0	0	0	0	2016	0	130	7,320	7,450
2017	0	0	0	0	2017	0	139	7,794	7,933
2018	0	0	0	0	2018	0	62	6,972	7,034
2019	0	0	0	0	2019	0	103	8,665	8,768

Source: Massport and HMMH, 2020.
Notes: Population counts for 2010 and later use the 2010 U.S. Census block data; Counts for 2000 used the 2000 U.S. Census data; Counts for 1990 used the 1980 U.S. Census data.
1 2017 noise analysis uses AEDT version 2d, 2016 used AEDT version 2cSP2, 2012 through 2015 used INM version 7.0d, 2011 used INM version 7.0c, 2010 used INM version 7.0b, 1990 and 2000 used earlier versions of INM. Data for years not shown here are available in Appendix H, *Noise Abatement*.
2 These values reflect the effect of the FAA-approved terrain adjustment in Orient Heights.
3 Day-Night Average Sound Level (DNL) 65 decibel (dB) is the federally defined noise criterion used as a guideline to identify when residential land use is considered incompatible with aircraft noise.

The estimated population (based on 2010 U.S. Census data) within the DNL 65 dB contour decreased by about 11 percent from 2017 to 2018 (going from 7,933 to 7,034) and increased again about 25 percent from 2018 to 2019 (to 8,768). The populated area included in the 2018 DNL 65 dB contour decreased in East Boston but increased in Winthrop and Revere, as compared to 2017. The populated area within the 2019 DNL 65 dB contour increased in East Boston and Winthrop and decreased in Revere, as compared to 2018.

Comparing Measured and Modeled Noise Levels

When changes in noise exposure are predicted through modeling, it is important to substantiate these modeled findings with actual noise measurements, such as those taken with Massport's permanent noise monitoring system. Massport's system continuously measures the noise levels at each of the 30 microphone locations around the Airport and environs, as shown in **Figure 6-17**. During normal operation, noise monitors at the microphone locations measure noise exposure levels as well as a variety of metrics associated with individual noise events that exceed preset threshold sound levels. Noise monitoring data are transmitted back to Massport's Noise Office, where daily DNL values and other noise metrics are computed for each location and summarized in various reports. It should be noted that noise monitoring microphones collect sound from not only aircraft noise events, but surrounding noise events such as roadway traffic and construction.

Table 6-8 compares the measured 2017, 2018, and 2019 aircraft noise DNL values at each location. The average measured value for 28 of the 30 sites was 56.4 dB in 2018 and 56.5 dB in 2019, a decrease of 0.5 dB and 0.4 dB, respectively, from the average of 56.9 dB in 2017. Shaded cells in **Table 6-9** indicate data that is not included in the averages or year to year comparison due to monitor malfunction.[26] For 2018, six locations had measured decreases of 2 dB or more as compared to the 2017 value, while seven had measured increases of 2 dB or more. Two sites did not have valid data for comparison. The remaining 14 locations had changes in levels of less than 2 dB. Comparing 2019 to 2018, three locations had measured decreases of 2 dB or more as compared to the 2017 value, while two had measured increases of 2 dB or more. Two sites did not have data for comparison. The remaining 23 locations had changes in levels of less than 2 dB.

Of the 30 noise monitor sites, two were not included in the average measured values for 2018 or 2019. The monitor at Site 1 was removed in May 2017,[27] and the monitor at Site 7 stopped collecting data in January 2018.[28] Therefore, Sites 1 and 7 are not included in any of the comparison analysis for 2018 and 2019. However, the four monitor sites that were unavailable or malfunctioning in 2017 (sites 12, 14, 18, and 26) were restored to normal operation in 2018.

26 Notes at the bottom of the table identify the sites with data collection difficulties for each year.

27 Massport selected two new locations for Site 1 and is discussing these potential locations with the South End community.

28 Site 7 was brought back online with new equipment in July 2020.

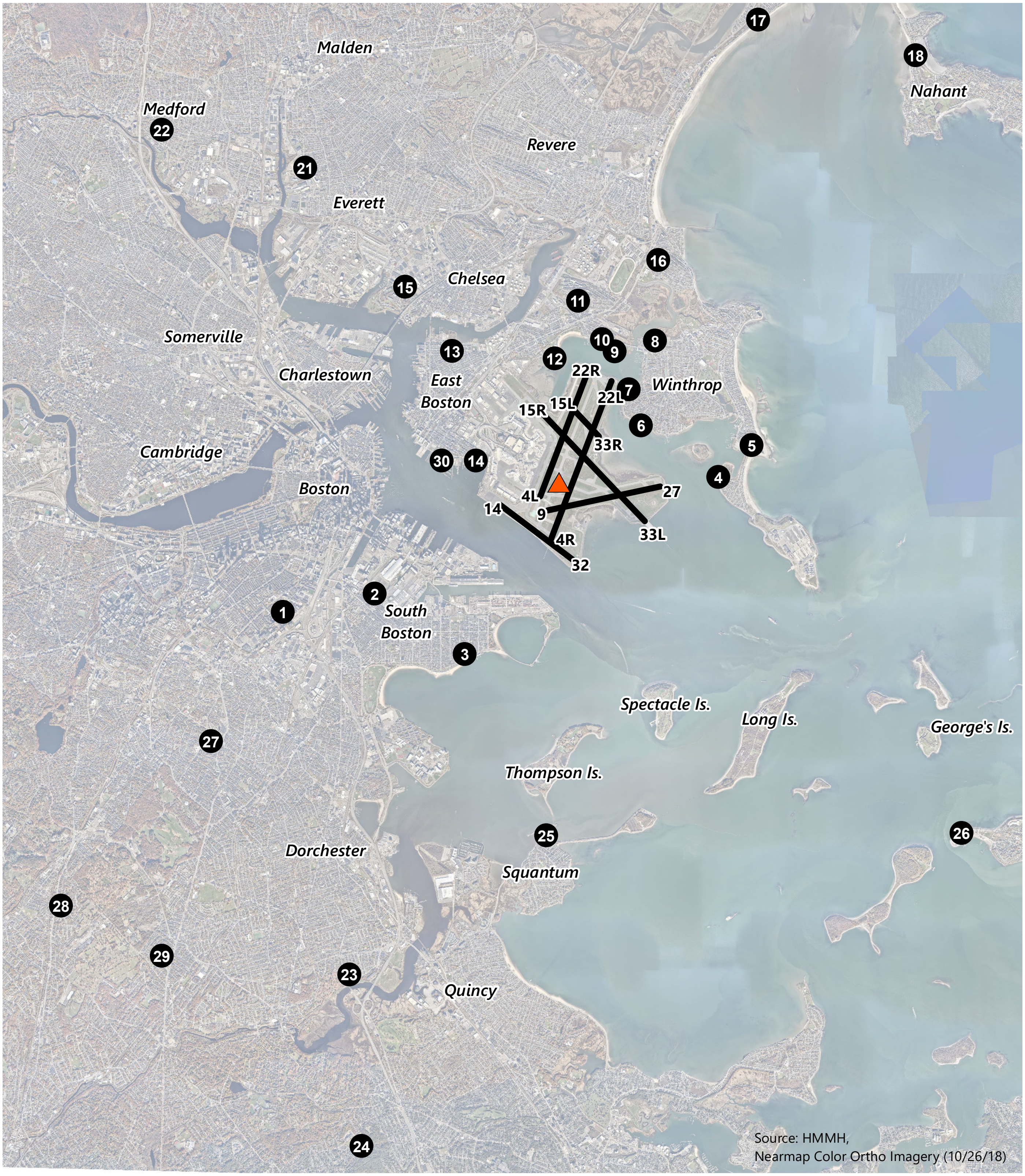

FIGURE 6-17 Noise Monitor Locations

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● Permanent Noise Monitor

▲ Airport Reference Point

0 2000 4000 8000 Feet

All sites have been verified by survey.
Locations not shown on map:
#19 Smith Lane, Swampscott
#20 Pond and Town Court, Lynn

Differences between measured and modeled values have narrowed over the years as both the noise monitoring and modeling processes have been refined. For 2018 and 2019, the differences between measured and modeled DNL average 2.2 dB and 2.4 dB, respectively. The 2017 average difference between measured and modeled DNL was 1.9 dB. Because the modeled values are generally larger (i.e., higher sound levels) than the measured values, especially at the more distant monitors, the average difference is usually a positive value.

As shown in **Table 6-9**, the agreement between measured and modeled DNL is within 1 dB at 12 of the sites in 2018 and 10 sites in 2019. At the other locations for 2018, the measured value exceeds the model result at only Site 6 in Winthrop. At the other locations for 2019, the measured value is 1 to 3 dB higher than the model result at four sites: Sites 3, 6, 11, and 16. When the majority of the measured noise values are less than the model results, as is the case for 2017 through 2019, that indicates that the contours tend to be conservative estimates of the noise. It is not unusual to experience larger differences between measured and modeled levels at the locations with measured DNL below 60 dB. At those locations, the monitor identification of aircraft noise events becomes more difficult to differentiate from other noise sources, and long-distance noise attenuation effects can reduce actual levels that the model cannot duplicate. Larger differences at these sites, which tend to be farther from the airport, increase the average overall difference between measured and modeled results.

The distances reported in **Tables 6-8** and **6-9** are computed from the Airport Reference Point which is located along Runway 4L-22R near its intersection with Runway 15R-33L. This location is shown in **Figure 6-17**.

Table 6-8 Measured Versus Measured – Comparison of Measured DNL Values From 2017 to 2019

Site	Location	Distance from Airport (miles)	Measured Aircraft (DNL) 2017	2018	2019	Difference 2018-2017	2019-2018
1	South End – Andrews Street	3.7	58.1	N/A	N/A	N/A	N/A
2	South Boston – B and Bolton	2.9	60.0	58.2*	58.6	(1.8)	0.4
3	South Boston – Day Blvd. near Farragut	2.5	58.6	62.1*	63.1*	3.5	1.0
4	Winthrop – Bayview and Grandview	1.6	71.1	72.0	72.5*	0.9	0.5
5	Winthrop – Harborview and Faun Bar	1.9	63.9	63.3	59.2	(0.6)	(4.1)
6	Winthrop – Somerset near Johnson	0.8	64.8	64.8*	64.6	0.0	(0.2)
7	Winthrop – Loring Road near Court	1.0	64.5	60.1*	N/A	(4.4)	N/A
8	Winthrop – Morton and Amelia	1.6	57.9	60.2	60.6	2.3	0.4
9	East Boston – Bayswater near Annavoy	1.3	60.6	67.5	68.6	6.9	1.1
10	East Boston – Bayswater near Shawsheen	1.3	61.3	63.0	63.0	1.7	0.0
11	East Boston – Selma and Orient	1.8	54.0	57.4*	60.2*	3.4	2.8
12	Coleridge Street, East Boston	1.2	N/A	63.5*	64.2*	63.5	0.7
13	East Boston High School	1.9	63.8	61.1*	62.9	(2.7)	1.8
14	East Boston – Jeffries Point Yacht Club	1.2	N/A	53.9	57.8*	N/A	3.9
15	Chelsea – Admiral's Hill	2.8	62.3	60.3*	61.9*	(2.0)	1.6
16	Revere – Bradstreet and Sales	2.4	68.3	70.3	70.4	2.0	0.1
17	Revere – Carey Circle	5.3	60.6	62.1	61.3	1.5	(0.8)
18	Nahant – U.S.C.G. Recreational Facility	5.9	43.4	39.8	38.4	(3.6)	(1.4)
19	Swampscott – Smith Lane	8.7	42.3	40.6	40.8	(1.7)	0.2
20	Lynn – Pond and Towns Court	8.4	51.9	54.3	54.4	2.4	0.1
21	Everett – Tremont near Prescott	4.5	55.4	50.2	51.2	(5.2)	1.0
22	Medford – Magoun near Thatcher	6.0	55.0	54.1	54.2	(0.9)	0.1
23	Dorchester – Myrtlebank near Hilltop	6.3	55.6	56.4	56.3	0.8	(0.1)
24	Milton – Cunningham Park near Fullers	8.1	48.0	49.2	49.4	1.2	0.2
25	Quincy – Squaw Rock Park	4.2	40.0	42.7	38.9	2.7	(3.8)
26	Hull – Hull High School near Channel St.	6.0	59.0	59.1	59.7	0.1	0.6
27	Roxbury – Boston Latin Academy	5.3	56.1	53.6	54.6	(2.5)	1.0
28	Jamaica Plain – Southbourne Road	7.7	50.6	47.4	46.4	(3.2)	(1.0)
29	Mattapan – Lewenburg School	7.3	42.6	42.3	37.4	(0.3)	(4.9)
30	East Boston – Piers Park	1.5	51.5	50.2	50.4	(1.3)	0.2
		Arithmetic Average	**56.9**	**56.4**	**56.5**	(0.03)	0.05

Source: HMMH, 2020.

Notes: DNL - Day-Night Average Sound Level; N/A – not available.
Changes in ( ) represent a decrease in measured noise level.
Distance from Logan Airport calculated from the Airport Reference Point.
* Indicates sites with more than 20 days missing from yearly average DNL. The monitor at Site 1 was removed in May 2017; Massport is reviewing options for relocation. Site 7 was operational for only one month in 2018 and none of 2019; it was restored in July 2020. Those two sites (shaded cells) are not included in the average values for 2018 or 2019.
In 2017, Site 12 (East Boston Yacht Club) was not operational; it was relocated to Coleridge Street, East Boston and started to collect data in February 2018. After being damaged, Site 26 (Hull High School) resumed operation in September 2017. Sites 14 and 18 experienced long-term technical problems. These four sites (shaded cells) are not included in the average values for 2017.

Table 6-9 Comparison of Measured DNL Values to AEDT Modeled DNL Values

Site[1]	Distance from Airport (miles)[2]	2017[3]		2018[4]		2019[4]		Difference: Modeled minus Measured		
		Measured Aircraft – Only DNL	Modeled (AEDT) DNL	Measured Aircraft – Only DNL	Modeled (AEDT) DNL	Measured Aircraft – Only DNL	Modeled (AEDT) DNL	2017	2018	2019
1	3.7	58.1	57.0	N/A	55.5	N/A	56.4	(1.1)	N/A	N/A
2	2.9	60.0	60.1	58.2*	59.0	58.6	59.7	0.1	0.8	1.1
3	2.5	58.6	61.3	62.1*	62.0	63.1*	61.8	2.7	(0.1)	(1.3)
4	1.6	71.1	72.5	72.0	71.5	72.5*	71.8	1.4	(0.5)	(0.7)
5	1.9	63.9	64.1	63.3	64.8	59.2	64.9	0.2	1.5	5.7
6	0.8	64.8	62.2	64.8*	62.3	64.6	62.4	(2.6)	(2.5)	(2.2)
7	1.0	64.5	65.3	60.1*	67.3	N/A	67.3	0.8	7.2	N/A
8	1.6	57.9	60.2	60.2	62.1	60.6	62.1	2.3	1.9	1.5
9	1.3	60.6	67.1	67.5	68.9	68.6	68.8	6.5	1.4	0.2
10	1.3	61.3	61.3	63.0	62.7	63.0	62.8	(0.0)	(0.3)	(0.2)
11	1.8	54.0	56.7	57.4*	57.5	60.2*	57.6	2.7	0.1	(2.6)
12	1.2	N/A	66.1	63.5*	65.9	64.2*	66.0	N/A	2.3	1.8
13	1.9	63.8	64.1	61.1*	62.9	62.9	63.9	0.3	1.8	1.0
14	1.2	N/A	62.1	53.9	61.7	57.8*	61.8	N/A	7.8	4.0
15	2.8	62.3	62.2	60.3*	60.3	61.9*	61.6	(0.1)	0.0	(0.4)
16	2.4	68.3	67.8	70.3	69.5	70.4	69.2	(0.5)	(0.8)	(1.2)
17	5.3	60.6	60.0	62.1	62.0	61.3	61.8	(0.6)	(0.1)	0.5
18	5.9	43.4	44.5	39.8	46.0	38.4	45.9	1.1	6.2	7.5
19	8.7	42.3	43.8	40.6	45.5	40.8	45.5	1.5	4.9	4.7
20	8.4	51.9	54.8	54.3	56.8	54.4	56.4	2.9	2.5	2.0
21	4.5	55.4	57.7	50.2	54.0	51.2	55.0	2.3	3.8	3.8
22	6.0	55	55.7	54.1	53.4	54.2	54.6	0.7	(0.8)	0.4
23	6.3	55.6	54.8	56.4	56.1	56.3	55.9	(0.8)	(0.3)	(0.4)
24	8.1	48	52.5	49.2	54.3	49.4	54.0	4.5	5.1	4.6
25	4.2	40	49.6	42.7	50.9	38.9	50.5	9.6	8.2	11.6
26	6.0	59.0	60.0	59.1	59.4	59.7	59.7	1.0	0.3	0.0
27	5.3	56.1	55.5	53.6	54.0	54.6	54.8	(0.6)	0.4	0.2
28	7.7	50.6	52.4	47.4	50.8	46.4	51.6	1.8	3.4	5.2
29	7.3	42.6	49.3	42.3	47.9	37.4	48.6	6.7	5.6	11.2
30	1.5	51.5	59.3	50.2	58.8	50.4	59.0	7.8	8.6	8.6
		56.9	**58.7**	**56.4**	**58.6**	**56.5**	**58.8**	1.9	2.2	2.4

Source: HMMH, 2018.
Notes: DNL – Day-Night Average Sound Level. Modeled results were computed for the whole year.
* Indicates sites with more than 20 days missing from measured yearly average DNL.
1 Site numbers correlate with the Figure 6-17 map and the addresses listed in Table 6-8
2 Distance from Logan Airport calculated from the Airport Reference Point.
3 Sites 12, 14, 18, and 26 are not included in the average values for 2017 due to monitor issues at those sites.
4 Sites 1 and 7 are not included in the average values for 2018 and 2019 due to monitor issues at those sites.

Supplemental Metrics

To further describe the noise environment, this *2018/2019 EDR* includes supplemental noise metrics: CNI, dwell and persistence, and times above a noise threshold.

Cumulative Noise Index (CNI)

Massport reports total annual fleet noise at Logan Airport, as defined in the Logan Airport Noise Rules by a metric referred to as CNI. CNI is a single number representing the sum of the entire set of single-event noise energy from each operation experienced at Logan Airport over a full year of operation. CNI is weighted similarly to DNL, meaning an extra 10 dB is added to each event occurring at night. This weighting is equivalent to multiplying the number of nighttime events of each aircraft by a factor of ten.

The Logan Airport Noise Rules define CNI in units of EPNdB[29] and require that the index be computed for the fleet of commercial aircraft operating at Logan Airport throughout the year. In addition, in EDRs and ESPRs, Massport reports partial CNI values of noise at Logan Airport, so that contributions from various subsets of the fleet (cargo, night operations, passenger jets, etc.) are identified. Using the expanded data available from the NOMS, all available aircraft registration data were used to select the proper noise certification levels from the latest aircraft noise registration database.[30]

The Noise Rules, adopted by Massport following public hearings held in February 1986, established a CNI limit of 156.5 EPNdB. As shown in the top lines of **Table 6-10**, the CNI generally has decreased since 1990, remaining below the cap, and typical changes from one year to the next have been within a few tenths of a dB. Since its 2010 minimum of 151.9 dB, the CNI has increased moderately. In 2018, the CNI increased by 0.3 dB over the 2017 value, to 153.4 and in 2019, the CNI increased by 0.1 dB over the 2018 value, to 153.5 EPNdB, remaining well below the cap of 156.5 EPNdB. The analysis of partial CNI values below helps to explain the yearly changes.

Partial Cumulative Noise Index (CNI) Calculations

Partial CNI values are obtained by summing the noise from particular segments of Logan Airport's total operations. They are useful for identifying the greatest contributors to overall noise. As shown in **Table 6-10**, the sectors of the fleet with the highest numbers of partial CNI indicate a greater contribution to total noise.

Year-to-year changes can be best understood by examining the subsets of jet operations in **Table 6-10**. The partial CNI decreased for cargo operations from 2017 to 2018, but then increased again slightly from 2018 to 2019. Nighttime passenger operations continue to increase in partial CNI from year to year as the numbers of those operations have increased. Passenger operations dominate the cumulative noise because they comprise about 98 percent of commercial jet operations.

29 Effective Perceived Noise level (EPNdB) is the noise metric used to certify aircraft by the FAA.

30 Type-certificate data sheet for noise database available from the European Aviation Safety Agency; http://www.easa.europa.eu/document-library/noise-type-certificates-approved-noise-levels.

Table 6-10 Cumulative Noise Index (CNI) (EPNdB)[1]

	Logan Airport CNI Cap – 156.5 EPNdB							
Full CNI (Entire Commercial Jet Fleet)	**1990**	**2000**	**2010**	**2017**	**2018**	**2019**	**Change (2018-2017)**	**Change (2019-2018)**
	156.4	**154.7**	**151.9**	**153.1**	**153.4**	**153.5**	**0.3**	**0.1**
Total Passenger Jets	155.2	153.6	150.9	152.6	153.0	153.1	0.4	0.1
Total Cargo Jets	150.1	148.2	145.1	143.4	142.9	143.0	(0.5)	0.1
Total Daytime	152.5	149.5	146.8	147.5	147.6	147.7	0.1	0.1
Total Nighttime	154.4	153.1	150.3	151.7	152.1	152.2	0.4	0.1
Daytime Passenger	N/A	149.3	146.6	147.3	147.5	147.6	0.2	0.1
Nighttime Passenger	N/A	151.6	149.0	151.1	151.6	151.7	0.5	0.1
Daytime Cargo	137.1	137.5	134.5	133.9	133.6	133.4	(0.3)	(0.2)
Nighttime Cargo	149.9	147.8	144.7	142.8	142.3	142.5	(0.5)	0.2

Source: HMMH, 2020.
Notes: General aviation and non-jet aircraft are not included in the calculation.
N/A Not available.
1 Data for years prior to 2017 are available in Appendix H, *Noise Abatement*.

Table 6-11 shows the relative contribution of each airline to total CNI. The table provides the number of flight operations, the resulting CNI by airline for 2016 and 2017, and the partial CNI per operation for 2017, 2018, and 2019. The data reflect the contributions of individual aircraft noise levels and the frequency with which they occur. The table is sorted by the partial CNI per operation for 2019 and shows a mix of mostly international carriers and cargo operators at the top of this list. This is due to the higher proportion of nighttime operations among these carriers, as well as the operation of larger and/or older aircraft.

jetBlue Airways, with the largest number of operations, has the highest CNI per airline at 147.3 EPNdB in 2017, 147.9 in 2018, and 148.1 in 2019, but its partial CNI by operation is below the other major airlines, partly due to its use of newer, quieter aircraft.

The cargo airline FedEx was noted in the *2017 ESPR* as having less than 4 percent of the operations of jetBlue Airways a total CNI per airline of 141.3 EPNdB in 2017, only 6 dB below jetBlue Airways. The partial CNI by operation for FedEx in 2017 was among the highest of all airlines due to its use of older DC-10 and MD-11 aircraft and operations at night, with those aircraft accounting for half of its nighttime operations. Since 2017, FedEx has replaced most of the operations by those older, noisier aircraft with B767s and A300s, with the effect of reducing its partial CNI by operation by 1.1 dB from 2017 to 2019 and reducing its ranking to sixth place, as opposed to being tied for second place.

Table 6-11 Annual Operations by Partial CNI by Airline and per Operation, 2017, 2018, and 2019

Airlines with more than 100 flights in either 2018 or 2019	Operations[1]			Total Airline CNI (EPNdB)			Partial CNI (EPNdB) per Operation			Airline Category
	2017	2018	2019	2017	2018	2019	2017	2018	2019	
El Al Israel Airlines Ltd.	298	288	296	130.8	130.9	131.4	106.0	106.3	106.7	International
Hawaiian Airlines	N/A	N/A	426	N/A	N/A	132.2	N/A	N/A	105.9	Domestic
United Parcel Service	2,053	2,073	2,096	138.5	138.2	138.9	105.4	105.0	105.7	Cargo
Cathay Pacific	652	703	699	133.7	133.4	133.7	105.6	104.9	105.2	International
Atlas Air	136	525	531	126.4	132.0	132.1	105.0	104.8	104.8	Cargo
Federal Express	3,755	3,790	3,775	141.3	140.5	140.3	105.6	104.7	104.5	Cargo
Emirates Airlines	1,034	734	719	131.7	130.4	131.1	101.6	101.8	102.5	International
Qatar Airways	728	734	730	124.3	125.5	130.4	95.7	96.8	101.8	International
Virgin Atlantic	764	778	1,361	127.6	128.9	132.8	98.8	100.0	101.5	International
British Airways	2,522	2,685	2,650	136.1	136.4	135.0	102.1	102.1	100.8	International
Swiss Air	924	942	978	128.1	129.8	130.1	98.4	100.0	100.2	International
Icelandair	1,265	1,041	1,044	129.1	126.3	130.0	98.0	96.1	99.8	International
Alaska Airlines	3,351	6,416	5,920	134.2	138.0	137.3	98.9	99.9	99.6	Domestic
Alitalia	548	544	550	127.7	126.9	126.9	100.4	99.5	99.5	International
Turkish Airlines	616	644	674	127.2	127.3	127.5	99.3	99.2	99.3	International
TACV-Cabo Verde	N/A	N/A	112	N/A	N/A	119.6	N/A	N/A	99.1	International
Lufthansa	1,707	1,662	1,703	130.1	129.6	131.3	97.8	97.4	99.0	International
KLM Royal Dutch Airlines	N/A	N/A	263	N/A	N/A	123.1	N/A	N/A	98.9	International
Norwegian Air Shuttle	767	376	697	126.1	124.8	127.2	97.3	99.0	98.8	International
Southwest Airlines	24,129	23,191	19,907	142.9	142.0	141.7	99.1	98.4	98.7	Domestic
United Airlines	24,636	27,652	27,318	143.1	143.4	142.9	99.1	99.0	98.5	Domestic
Royal Air Maroc	N/A	N/A	161	N/A	N/A	120.5	N/A	N/A	98.4	International
Delta Air Lines	35,921	39,074	42,218	143.2	144.0	144.6	97.7	98.1	98.3	Domestic
TAM- Linhas Aereas S.A.	N/A	210	476	N/A	123.2	124.8	N/A	100.0	98.1	International
Iberia Air Lines Of Spain	464	707	859	123.6	125.3	127.1	96.9	96.9	97.7	International
American Airlines	51,296	54,253	50,333	144.7	145.1	144.7	97.6	97.8	97.7	Domestic
jetBlue Airways	100,892	107,557	114,091	147.3	147.9	148.1	97.3	97.5	97.6	Domestic
Scandinavian Airlines	536	320	369	122.1	122.5	123.2	94.8	97.5	97.5	International
Frontier Airlines, Inc.	N/A	N/A	1,211	N/A	N/A	128.1	N/A	N/A	97.3	Domestic
Air France	884	828	856	127.4	126.8	126.5	97.9	97.6	97.2	International

Table 6-11 Annual Operations and Partial CNI by Airline and per Operation, 2017, 2018 and 2019 (Continued)

Airlines with more than 100 flights in either 2018 or 2019	Operations[1]			Total Airline CNI (EPNdB)			Partial CNI (EPNdB) per Operation			Airline Category
	2017	2018	2019	2017	2018	2019	2017	2018	2019	
Aer Lingus	2,011	1,995	1,860	129.9	130.0	129.5	96.9	97.0	96.8	International
Spirit Airlines	8,853	10,269	9,838	135.7	136.3	136.5	96.2	96.2	96.6	Domestic
SATA International	844	780	809	128.6	124.8	125.3	99.4	95.9	96.2	International
Sky Regional Airlines Inc	1,470	4,574	4,345	129.0	132.7	132.4	97.3	96.1	96.0	International
SkyWest Airlines	N/A	3,632	4,880	N/A	131.1	132.9	N/A	95.5	96.0	Domestic
TAP - Air Portugal	643	642	644	125.0	124.7	124.0	96.9	96.7	95.9	International
Norwegian Air UK	N/A	552	732	N/A	123.3	124.3	N/A	95.9	95.6	International
Korean Air Lines Co., Ltd.	N/A	N/A	367	N/A	N/A	121.1	N/A	N/A	95.5	International
Aeromexico	667	501	218	125.9	124.1	118.2	97.7	97.1	94.8	International
WOW Air, LLC.	724	722	171	124.0	123.8	117.1	95.4	95.2	94.8	International
Compañía Panameña.	730	1,100	962	122.9	124.3	124.3	94.2	93.9	94.5	International
Japan Airlines	730	732	728	124.1	123.1	123.1	95.5	94.4	94.5	International
Hainan Airlines Co. Ltd.	1,032	1,078	1,056	125.8	124.9	124.6	95.7	94.5	94.4	International
Republic Airlines	11,994	12,051	21,832	136.1	135.7	137.7	95.3	94.8	94.4	Domestic
MN Airlines, LLC	1,391	1,030	288	131.2	127.4	118.8	99.8	97.3	94.2	Domestic
Endeavor Air	7,977	10,712	10,520	132.2	134.6	133.9	93.2	94.3	93.7	Domestic
Air Canada	3,947	1,126	1,908	129.6	123.0	126.2	93.7	92.4	93.4	International
TACA International.	N/A	156	136	N/A	113.9	114.2	N/A	92.0	92.9	International
Mesa Airlines	327	138	110	117.5	112.2	112.5	92.4	90.8	92.1	Domestic
Piedmont Airlines	729	1,127	3,087	118.9	121.9	126.8	90.2	91.4	91.9	Domestic
Jazz Air Inc.	5,947	4,981	2,922	128.6	128.3	126.2	90.8	91.3	91.6	International
GoJet Airlines	3,136	2,686	968	127.9	124.9	120.8	92.9	90.6	90.9	Domestic
Expressjet	3,660	2,618	300	127.0	125.1	114.9	91.3	90.9	90.1	Domestic
Envoy Airlines	N/A	3,388	396	N/A	127.4	116.0	N/A	92.2	90.0	Domestic
Aerovias de Mexico.	N/A	657	N/A	N/A	126.8	N/A	N/A	98.6	N/A	International
Thomas Cook Airlines	154	104	N/A	117.7	115.6	N/A	95.9	95.4	N/A	International
Primera Air Scandinavia	N/A	238	N/A	N/A	118.1	N/A	N/A	94.3	N/A	International
Trans States Airlines, Inc.	N/A	228	N/A	N/A	113.3	N/A	N/A	89.8	N/A	Domestic

Source: Massport and HMMH, 2020.
Notes: CNI – Cumulative Noise Index
N/A Not available; airline had no operations at Logan Airport.
1 Operations for some carriers differ to those in Chapter 2, *Activity Levels,* and Chapter 7, *Air Quality/Emissions Reduction,* because this table only includes jet aircraft and not turboprops, and because it includes both scheduled and unscheduled air carriers.

Regional carriers generally contribute the least to the partial CNI per operation whereas the international carriers, which operate larger aircraft and generally have more operations at night, are just below the major cargo operators in rank. The relative positions for the domestic carriers are due mainly to their fleet characteristics and number of night operations. United Airlines and Southwest Airlines each reduced their partial CNI by operation from 2017 to 2019. For United Airlines, this reduction may have been due to reducing its percentage of nighttime operations from 23 percent to 19 percent. For Southwest Airlines, whose nighttime percent went from 20 percent to 23 percent, the CNI per operation reduction is attributable to a quieter fleet. jetBlue Airways had about 21 percent of its operations at night in 2019, but over 50 percent of its operations were by the relatively smaller and quieter EMB190 aircraft.

Dwell and Persistence Reporting

Another supplemental measure of noise impact relates to the length of time for which noise impacts occur. To provide temporary relief to neighborhoods affected by regular overflights during single- or multi-day periods, the PRAS Advisory Committee in 1982 established two short-term goals for the system beyond its annual goals:

- Provide relief from excessive dwell. Exceedance is defined as more than seven hours of operations over a given area during any day between the hours of 7:00 AM and midnight.
- Provide relief from excessive persistence. Exceedance is defined as more than 23 hours of operations over an area between 7:00 AM and midnight during a period of three consecutive days.

In contrast to the annual PRAS goals that counted the number of equivalent operations on a runway, dwell and persistence are measured by the number of hours that a given location or area is subject to jet aircraft overflights. The PRAS Advisory Committee designated eight runway end combinations for computing the effects of dwell and persistence on the communities, as shown in **Table 6-12**.

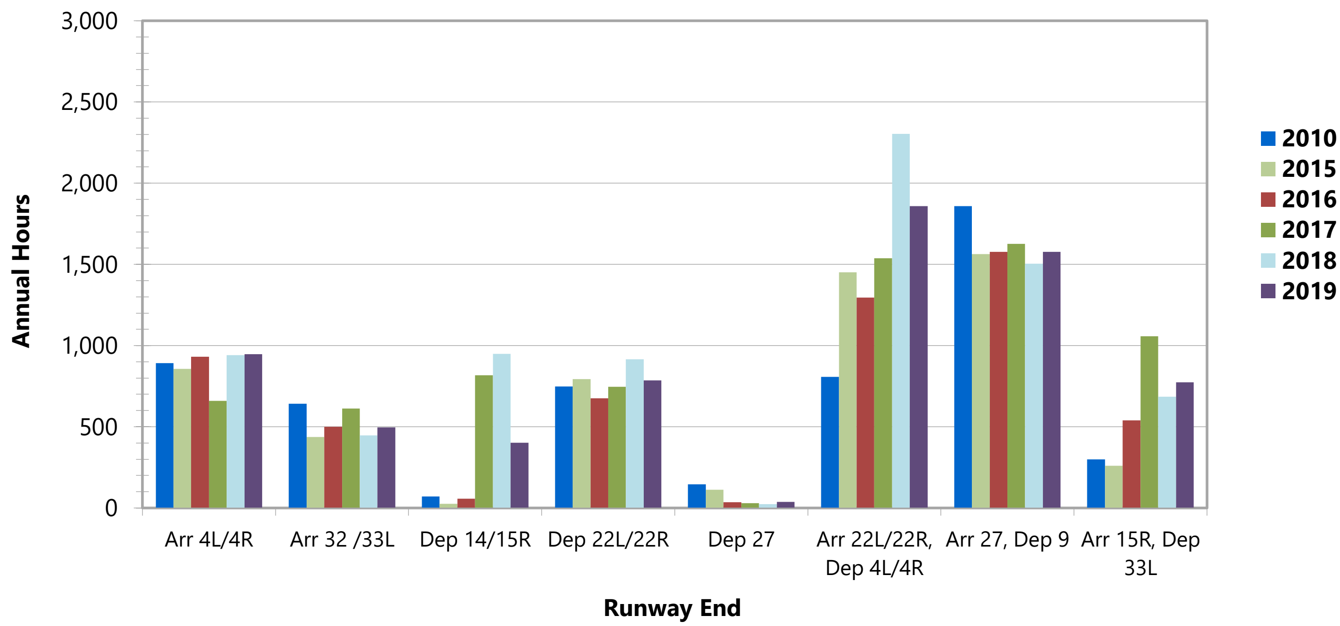
Table 6-12 Representative Neighborhoods near Logan Airport Affected by Runway Use

Runway	Representative Affected Neighborhoods
4L and 4R Arrivals	South Boston (Farragut St.), Dorchester, Quincy, Milton, Weymouth, and Braintree
32 and 33L Arrivals	Boston Harbor, Hull, Cohasset, Hingham, Scituate, and other South Shore locations
14 and 15R Departures	Boston Harbor, Hull, Cohasset, Hingham, Scituate, and other South Shore locations
22L and 22R Departures	South Boston (Farragut Street), Boston Harbor, Hull, Cohasset, Hingham, Scituate, and other South Shore locations
27 Departures	South Boston (Fan Pier), Roxbury, Jamaica Plain, South End, West Roxbury, Roslindale, Brookline, Hyde Park, and other points South and West
4L and 4R Departures plus 22L and 22R Arrivals	East Boston (Bayswater, Orient Heights), Winthrop (Court Road), Revere, and Nahant
9 Departures plus 27 Arrivals	Winthrop (Point Shirley), Boston Harbor, and other points North
33 Departures plus 15 Arrivals	East Boston (Eagle Hill), Chelsea, Everett, Medford, Somerville, Arlington, Cambridge, Belmont, and other points South and West

As required by Massport's commitments for the Logan Airside Improvements Planning Project,[31] this *2018/2019 EDR* reports on noise dwell and persistence levels. Higher levels of dwell or persistence for over-water areas represent a benefit since this produces a corresponding decrease in total hours overpopulated areas. **Figures 6-18** and **6-19** illustrate the annual hours of dwell and persistence by runway end for 2015 through 2019, with 2010 hours included for reference.

In general, dwell and persistence analysis results for 2017, 2018, and 2019 are quite similar. The most marked difference in both metrics for 2018 is the increase in hours of configurations affecting the north side of the airport: arrivals to Runways 22L or 22R or departures from Runways 4L or 4R. Those hours remained high in 2019, but less so. In 2018, the increase in hours of configurations including Runway 15R departures that was noted for 2017 continued, but that trend dropped off in 2019. On the other side of the Airport, in configurations including Runway 33L departures, the sharp increase observed in 2017 dropped off in 2018 and 2019 but remained high in comparison to previous years.

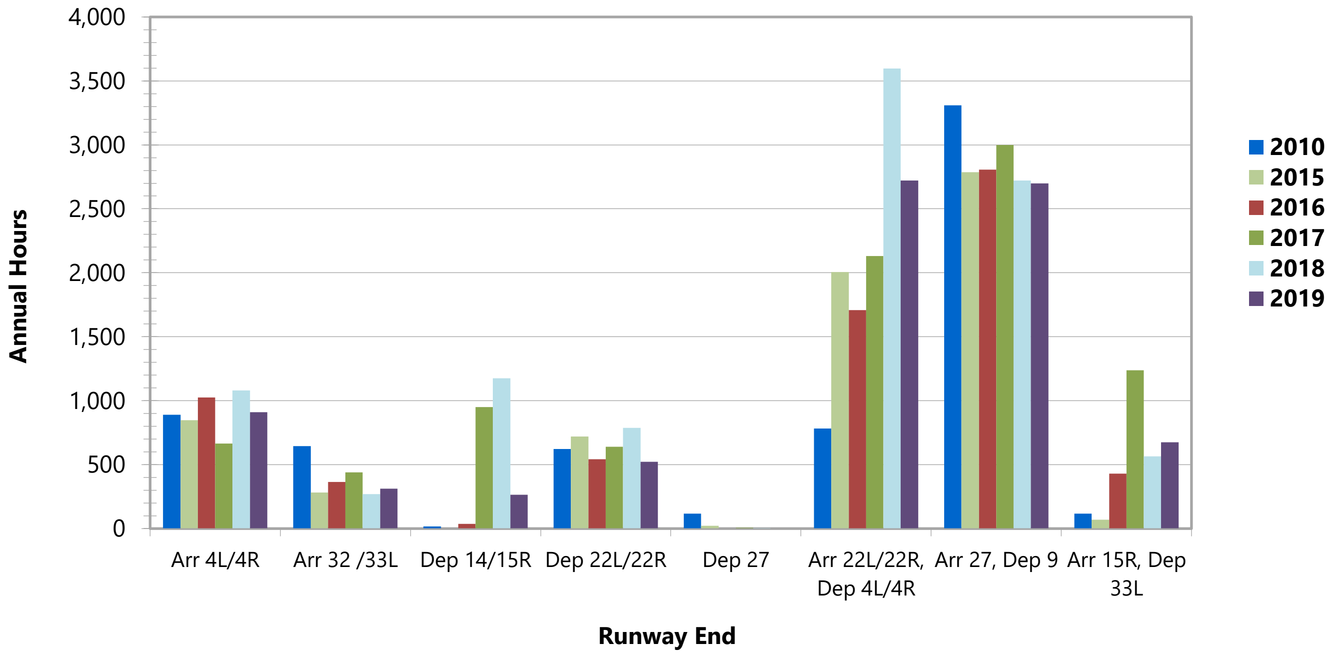
Figure 6-18 Comparison of Annual Hours of Dwell Exceedance by Runway End



Source: HMMH, 2020.

31 Federal Aviation Administration. 2002. *Logan Airside Improvements Planning Project Final EIS*.

Figure 6-19 Comparison of Annual Hours of Persistence Exceedance by Runway End



Source: HMMH, 2020.

Time Above (TA)

The third supplemental noise metric reported in this *2018/2019 EDR* is the amount of time that aircraft noise is above each of three predefined threshold sound levels. The measure is referred to generally as TA, and the threshold sound levels used in the analysis are 65, 75, and 85 dBA. Like DNL values, these times are computed using the FAA-approved AEDT. The calculations are made at each of Massport's permanent noise monitoring locations and are based on an average 24-hour day during the year as well as the average nine-hour nighttime period from 10:00 PM to 7:00 AM. The threshold sound levels of 65, 75, and 85 dBA reflect different degrees of speech interference depending on factors such as whether people are outdoors, indoors with their windows open, or indoors with windows closed. **Tables 6-13** and **6-14** present a summary of the AEDT-calculated TA values for 2017, 2018, and 2019.

Table 6-13 Time Above (TA) dBA Thresholds in a 24-Hour Period for Average Day

		Minutes above Threshold									Modeled DNL (dB)[3]		
		2017			2018			2019			2017	2018	2019
Site[1]	Distance[2] (mi)	85 dBA	75 dBA	65 dBA	85 dBA	75 dBA	65 dBA	85 dBA	75 dBA	65 dBA			
1	3.7	0.0	0.1	18.0	0.0	0.1	13.2	0.0	0.1	16.2	57.0	55.5	56.4
2	2.9	0.0	1.7	28.4	0.0	1.5	20.8	0.0	1.6	25.0	60.1	59.0	59.7
3	2.5	0.0	3.3	58.5	0.0	2.9	77.8	0.0	2.7	72.7	61.3	62.0	61.8
4	1.6	9.0	42.5	110.1	7.8	44.3	112.4	8.0	45.7	116.0	72.5	71.5	71.8
5	1.9	0.1	11.3	85.7	0.1	15.3	90.4	0.1	15.4	94.2	64.1	64.8	64.9
6	0.8	0.0	1.1	58.3	0.0	1.1	62.0	0.0	0.9	61.6	62.2	62.3	62.4
7	1.0	0.5	6.6	84.3	0.8	10.4	111.6	0.7	9.5	101.3	65.3	67.3	67.3
8	1.6	0.0	1.8	30.6	0.0	3.4	47.6	0.0	3.2	44.4	60.2	62.1	62.1
9	1.3	0.7	18.4	74.3	1.1	27.0	97.1	1.0	25.4	89.7	67.1	68.9	68.8
10	1.3	0.1	3.0	42.6	0.0	5.1	53.8	0.0	4.9	52.1	61.3	62.7	62.8
11	1.8	0.0	0.5	11.8	0.0	1.0	15.0	0.0	0.8	14.0	56.7	57.5	57.6
12[5]	1.2	0.0	10.3	141.7	0.1	8.7	90.3	0.1	9.7	91.9	66.1	65.9	66.0
13	1.9	0.1	9.6	58.4	0.1	7.8	38.9	0.1	8.8	46.8	64.1	62.9	63.9
14	1.2	0.0	0.6	61.8	0.0	0.4	55.0	0.0	3.5	38.6	62.1	61.7	61.8
15	2.8	0.0	5.2	51.0	0.0	3.1	31.9	0.8	24.7	58.8	62.2	60.3	61.6
16	2.4	1.3	18.3	44.9	0.8	26.4	63.7	0.0	0.9	53.5	67.8	69.5	69.2
17	5.3	0.0	0.9	38.6	0.0	1.0	56.1	0.0	0.0	0.2	60.0	62.0	61.8
18	5.9	0.0	0.0	0.3	0.0	0.0	0.2	0.0	0.0	0.5	44.5	46.0	45.9
19	8.7	0.0	0.0	0.4	0.0	0.0	0.6	0.0	0.0	13.0	43.8	45.5	45.5
20	8.4	0.0	0.0	12.0	0.0	0.0	15.4	0.0	0.0	14.3	54.8	56.8	56.4
21	4.5	0.0	0.8	24.9	0.0	0.1	12.2	0.0	0.1	11.3	57.7	54.0	55.0
22	6	0.0	0.2	14.8	0.0	0.1	9.7	0.0	0.0	20.8	55.7	53.4	54.6
23	6.3	0.0	0.0	17.8	0.0	0.0	22.3	0.0	0.0	7.8	54.8	56.1	55.9
24	8.1	0.0	0.0	7.2	0.0	0.0	8.8	0.0	0.0	0.2	52.5	54.3	54.0
25	4.2	0.0	0.0	0.3	0.0	0.0	0.3	0.0	0.1	29.9	49.6	50.9	50.5
26	6	0.0	0.2	33.0	0.0	0.1	27.6	0.0	0.0	12.7	60.0	59.4	59.7
27	5.3	0.0	0.1	14.4	0.0	0.0	10.6	0.0	0.0	3.2	55.5	54.0	54.8
28	7.7	0.0	0.0	4.0	0.0	0.0	2.9	0.0	0.0	0.2	52.4	50.8	51.6
29	7.3	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.2	15.6	49.3	47.9	48.6
30	1.5	0.0	0.2	21.6	0.0	0.2	15.5	0.0	3.5	38.6	59.3	58.8	59.0
Average TA Value[4]		0.4	4.6	38.3	0.4	5.3	38.8	0.4	5.3	38.7	58.7	58.8	59.0

Source: HMMH, 2020.
Notes: dBA - A-weighted decibel; dB – decibel; DNL - Day-Night Average Sound Level.
1 Site numbers correlate with the Figure 6-17 map and the addresses listed in Table 6-8
2 Distance from Logan Airport calculated from the Airport Reference Point.
3 2017 modeled with AEDT version 2d, 2018 and 2019 modeled with AEDT version 3c.
4 Arithmetic average includes all noise monitoring sites.
5 Site 12 was relocated to Coleridge Street, East Boston in 2018.

Table 6-14 Time Above (TA) dBA Thresholds in a Nine Hour Night Period for Average Day[3]

		Minutes above Threshold									Modeled DNL (dB)[4]		
		2017			2018			2019			2017	2018	2019
Site[1]	Distance[2] (mi)	85 dBA	75 dBA	65 dBA	85 dBA	75 dBA	65 dBA	85 dBA	75 dBA	65 dBA			
1	3.7	0.0	0.0	4.7	0.0	0.0	3.2	0.0	0.0	4.1	57.0	55.5	56.4
2	2.9	0.0	0.5	7.2	0.0	0.4	4.9	0.0	0.5	6.1	60.1	59.0	59.7
3	2.5	0.0	0.3	6.5	0.0	0.1	11.1	0.0	0.1	10.5	61.3	62.0	61.8
4	1.6	1.5	5.5	15.1	1.0	5.1	14.2	1.2	5.7	15.4	72.5	71.5	71.8
5	1.9	0.0	1.1	10.8	0.0	1.7	10.5	0.0	1.8	11.8	64.1	64.8	64.9
6	0.8	0.0	0.3	10.1	0.0	0.2	10.4	0.0	0.2	10.8	62.2	62.3	62.4
7	1	0.1	0.8	13.6	0.2	1.5	22.0	0.2	1.6	20.9	65.3	67.3	67.3
8	1.6	0.0	0.2	6.0	0.0	0.4	10.9	0.0	0.5	10.4	60.2	62.1	62.1
9	1.3	0.1	3.5	12.6	0.2	6.4	20.0	0.2	6.1	18.9	67.1	68.9	68.8
10	1.3	0.0	0.3	7.7	0.0	0.6	11.0	0.0	0.6	10.9	61.3	62.7	62.8
11	1.8	0.0	0.1	1.8	0.0	0.1	2.2	0.0	0.1	2.2	56.7	57.5	57.6
12[6]	1.2	0.0	2.5	22.0	0.1	2.3	18.9	0.1	2.6	19.5	66.1	65.9	66.0
13	1.9	0.0	1.9	9.5	0.0	1.3	5.8	0.1	1.7	7.5	64.1	62.9	63.9
14	1.2	0.0	0.2	12.5	0.0	0.1	11.3	0.0	0.1	11.7	62.1	61.7	61.8
15	2.8	0.0	1.2	8.2	0.0	0.6	4.6	0.0	0.9	6.0	62.2	60.3	61.6

Table 6-14 Time Above (TA) dBA Thresholds in a Nine Hour Night Period for Average Day[3] (Continued)

		Minutes above Threshold									Modeled DNL (dB)[4]		
		2017			2018			2019			2017	2018	2019
Site[1]	Distance[2] (mi)	85 dBA	75 dBA	65 dBA	85 dBA	75 dBA	65 dBA	85 dBA	75 dBA	65 dBA			
16	2.4	0.3	3.7	8.3	0.2	6.5	14.6	0.2	6.1	13.6	67.8	69.5	69.2
17	5.3	0.0	0.2	7.8	0.0	0.3	14.1	0.0	0.2	13.4	60.0	62.0	61.8
18	5.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	44.5	46.0	45.9
19	8.7	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	43.8	45.5	45.5
20	8.4	0.0	0.0	2.8	0.0	0.0	4.6	0.0	0.0	3.9	54.8	56.8	56.4
21	4.5	0.0	0.1	4.3	0.0	0.0	2.0	0.0	0.0	2.5	57.7	54.0	55.0
22	6	0.0	0.1	2.8	0.0	0.0	1.7	0.0	0.0	2.2	55.7	53.4	54.6
23	6.3	0.0	0.0	2.1	0.0	0.0	3.3	0.0	0.0	3.0	54.8	56.1	55.9
24	8.1	0.0	0.0	0.8	0.0	0.0	1.2	0.0	0.0	1.1	52.5	54.3	54.0
25	4.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.6	50.9	50.5
26	6	0.0	0.1	9.5	0.0	0.0	8.2	0.0	0.0	9.3	60.0	59.4	59.7
27	5.3	0.0	0.0	3.8	0.0	0.0	2.6	0.0	0.0	3.2	55.5	54.0	54.8
28	7.7	0.0	0.0	1.2	0.0	0.0	0.8	0.0	0.0	0.9	52.4	50.8	51.6
29	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	49.3	47.9	48.6
30	1.5	0.0	0.0	5.5	0.0	0.0	3.8	0.0	0.0	4.0	59.3	58.8	59.0
Average TA Value[5]		0.1	0.7	6.6	0.1	0.9	7.3	0.1	1.0	7.5	58.7	58.8	59.0

Source: HMMH, 2020.
Notes: dBA - A-weighted decibel; dB – decibel; DNL - Day-Night Average Sound Level.
1 Site numbers correlate with the Figure 6-17 map and the addresses listed in Table 6-8
2 Distance from Logan Airport calculated from the Airport Reference Point.
3 Nine-hour nighttime period from 10:00 PM – 7:00 AM.
4 2017 modeled with AEDT version 2d, 2018 and 2019 modeled with AEDT version 3c.
5 Arithmetic average includes all noise monitoring sites.
6 Site 12 was relocated to Coleridge Street, East Boston in 2018.

Noise Abatement Efforts

Massport's noise abatement program continues to play a critical role in helping to limit and monitor noise impacts. Massport's emphasis on noise abatement has focused on the benefits of better analysis tools, involvement in noise research projects and improved modeling techniques to identify the causes of noise problems. Massport also continues to coordinate with FAA and the Massport CAC on matters related to runway use and the ongoing RNAV Pilot project.

Massport's NOMS, installed in 2008, includes extensive analysis and mapping capabilities, the latest FAA NextGen radar data feed, use of multilateration radar (a separate and unique source of operational data), improved noise complaint handling, and direct correlation of noise events with radar flight paths and complaints (a feature that the prior system did not have). This latter capability has improved the ability of the system to differentiate between aircraft and community noise sources. All measured data and complaint information in this report were generated through the NOMS. Massport evaluated the current system in early 2018 and went out to bid for an upgraded NOMS in late 2018. The prior vendor L3Harris was selected and in 2019 L3Harris began upgrading the system including additional reports and the option for Virtual Noise Monitors (VNM). Massport has replaced the equipment for six permanent noise monitors (Sites 4, 5, 7, 9, 12, and 16). Massport identified two proposed locations for the relocation of Site 1 in South Boston and discussions with the community are ongoing.

The Logan Airport noise mitigation program includes operational restrictions on certain runways, limits to engine runup locations, late night runway preference, and noise abatement turns. Other continuing elements of Massport's noise mitigation program are discussed below.

Residential Sound Insulation Program

- In accordance with FAA requirements, Massport has one of the most extensive residential and school sound insulation programs in the nation. To date, Massport has installed sound insulation in 5,467 residences, including 11,515 dwelling units, and 36 schools in East Boston, Roxbury, Dorchester, Winthrop, Revere, Chelsea, and South Boston. Historically, the percentage of eligible homeowners who have responded and whose dwellings are ultimately treated varies significantly by community from a high of nearly 90 percent in Revere to a low of about 50 percent in South Boston. Approximately 80 to 85 percent of homeowners in East Boston and Winthrop have historically participated. Approximately 8 percent of applicants also choose the Room-of-Preference option that allows the owner to identify a room (usually a bedroom or living room) for extra acoustical treatment.
- Eligibility for sound insulation must follow FAA guidelines which state that the residence must be located within the latest DNL 65 dB contour submitted to the FAA and a noncompatible structure must be experiencing existing interior noise levels within habitable rooms that are 45 dB or greater with the windows closed to be considered eligible.[32] Also, structures constructed after October 1, 1998 are not eligible and structures that do not meet building codes are not eligible until the building's deficiencies

32 FAA Airport Improvement Handbook, Appendix R.

have been addressed. The FAA will allow a residence to be treated under the sound insulation program one time; homes treated previously are not eligible for additional consideration.[33]

- Massport continues to work with the FAA to sound insulate eligible homes and will apply for FAA funds to treat eligible properties, as needed. As of 2015, the FAA requires airports to use the AEDT model to establish eligibility. Since AEDT was new, Massport evaluated the model and worked with FAA over a three-year period to try to include previously developed Logan Airport-specific model adjustments. In 2019, Massport updated its RSIP Noise Exposure Map contours and submitted an AEDT-derived noise exposure map to FAA in 2020 for review and discussion. The FAA has requested that the updated sound insulation program contour represent 2019 operational conditions due to the significant reduction in aircraft operations in 2020 resulting from the COVID-19 pandemic. Once accepted by the FAA, Massport will reach out to eligible homeowners to discuss potential mitigation options for their homes, subject to federal and Massport funding availability.
- In January 2020, Massport's CEO sent a letter to the FAA Associate Administrator requesting that Massport and the FAA work together to address re-treatment of homes that were sound insulated during the early years of the program to upgrade eligible homes to newer more effective and durable materials. The Associate Administrator responded that the FAA is exploring limited circumstances under which Massport might be able to mitigate homes that had been mitigated before the FAA first issued sound insulation standards in 1993. The status of the initiative will be reported in future EDRs. See Appendix H, *Noise Abatement* for additional information.
- The Massport Noise Abatement Office was founded in 1977 and maintains the noise section of the Massport website.[34] The website provides information on Massport's sound insulation program, the Airport's noise monitoring system, various abatement measures, and other information of interest to the public.

Other Massport Noise Initiatives

- Massport develops annual noise contours (**Figures 6-12** through **6-15** present contours for 2018 and 2019).
- Massport's website features a web-based flight tracking system known as PublicVue.[35] The PublicVue site allows the user to view flight tracks in near-real time, replay flight tracks, and enter noise complaints.
- The Noise Office uses summary reports of operations by airline, runway, aircraft type, and other parameters to help track potential changes in the noise environment. **Tables 6-11** (Partial CNI) and **6-13** (Time Above) are examples of these reports.
- Massport, in an advisory role, participated in the completed FAA BLANS process, which designed RNAV departure procedures off most runways to avoid highly populated areas and the use of an over-water visual approach at night to keep aircraft offshore as much as possible.

33 FAA Airport Improvement Handbook, Table C-5 Item (8), page C-19.

34 Logan Airport Noise Abatement Website. http://www.massport.com/logan-airport/about-logan/noise-abatement/.

35 Massport. *Flight Monitor.* http://www.massport.com/logan-airport/about-logan/noise-abatement/flight-monitor/.

- Massport supports, where possible, the Massport CAC. The Massport CAC is a state-legislated body that works with Massport on a range of Authority-wide topics, including environmental issues. Further information about the Massport CAC can be found at http://massportcac.org/.
- Massport annually contacts airlines to encourage the use of single engine taxiing whenever possible and encouraging the vortex generator retrofit of the Airbus A320 family.
- Massport strives to participate in research to reduce community noise levels whether through the Airport Cooperative Research Program (ACRP) or with FAA, such as the RNAV Pilot project currently underway.
- Massport has been working with the Massachusetts Institute of Technology (MIT) and FAA to evaluate PBN procedures and possible changes to these procedures as part of the RNAV Pilot project since 2016.
- Massport is a member of the Aviation Sustainability Center (ASCENT) which is a coalition of 16 leading U.S. research universities and over 60 private sector stakeholders (including Massport) committed to reducing the environmental impact of aviation. Massport is actively participating in two research initiatives on aircraft noise.[36]

Airline Fleet Improvements

Commercial air carrier and cargo operators are deploying the newest engine technology at Logan Airport. **Table 6-15** reports the percent of an airline's fleet that is Stage 3, Stage 4 equivalent, or Stage 5 equivalent for 2017, 2018, and 2019. All of the major U.S. airlines at Logan Airport are using a fleet composed of 100 percent originally manufactured Stage 3, Stage 4, or Stage 5 aircraft. All new carriers at Logan Airport in 2018 and 2019 are using Stage 4 or Stage 5 equivalent aircraft. As reported in **Table 6-3**, the new FAA Stage 5 requirements are already satisfied by over 15 percent of Logan Airport jet operations for 2018 and 2019.

Massport recently completed terminal and airfield improvements designed to safely handle the next generation of larger and more efficient FAA Design Group VI aircraft. Use of the larger aircraft – such as the 747-800 and the A380, which efficiently carry higher numbers of passengers – increased from 2017 to 2019. Use of new engine technology aircraft has also been increasing such as the A320neo family with the addition of Frontier Airline flights in 2019 and jetBlue Airways A321neo operations. Additionally, Delta Air Lines introduced Airbus A220 flights and use of Boeing 787 models. Due to the COVID-19 pandemic, several airlines have retired larger and older aircraft such as the Airbus A330 and A380, Boeing 747, 757, 767, and MD-88, Embraer 190, and the smaller CRJ200 regional jet. When traffic does return to more typical levels, it is anticipated that the mix of aircraft types will be different (a much newer fuel-efficient fleet) than the aircraft mix reported in this EDR.

36 https://ascent.aero/participant/massachusetts-port-authority/

Table 6-15 Airline Operations Percentages in Original Stage 3 or Equivalent Stage 4/5 Aircraft (2017 to 2019)

Airlines with more than 100 flights	Number of Flights[1]			Percentage of Stage 3 or Equivalent Stage 4 or 5 Operations[2]								
	2017	2018	2019	2017 Stage 3	2017 Stage 4	2017 Stage 5	2018 Stage 3	2018 Stage 4	2018 Stage 5	2019 Stage 3	2019 Stage 4	2019 Stage 5
jetBlue Airways	100,892	107,557	114,091	0%	94%	6%	0%	96%	4%	0%	98%	2%
American Airlines	51,296	54,253	50,333	1%	85%	14%	1%	90%	9%	1%	87%	12%
Delta Air Lines	35,921	39,074	42,218	5%	75%	20%	3%	84%	13%	2%	86%	12%
United Airlines	24,636	27,652	27,318	0%	76%	24%	0%	77%	23%	0%	61%	39%
Republic Airlines	11,994	12,051	21,832	2%	98%	0%	0%	100%	0%	0%	100%	0%
Southwest Airlines	24,129	23,191	19,907	13%	86%	1%	0%	97%	3%	0%	99%	1%
Endeavor Air	7,977	10,712	10,520	0%	92%	8%	0%	93%	7%	0%	100%	0%
Spirit Airlines	8,853	10,269	9,838	0%	8%	92%	0%	10%	90%	0%	16%	84%
Alaska Airlines	3,351	6,416	5,920	0%	100%	0%	0%	92%	8%	0%	92%	8%
SkyWest Airlines	NA	3,632	4,880	N/A	N/A	N/A	48%	52%	0%	100%	0%	0%
Sky Regional Airlines Inc	1,470	4,574	4,345	0%	100%	0%	0%	100%	0%	0%	100%	0%
Federal Express	3,755	3,790	3,775	15%	84%	0%	4%	96%	0%	4%	96%	0%
Piedmont Airlines	729	1,127	3,087	0%	0%	100%	0%	0%	100%	0%	0%	100%
Jazz Air Inc.	5,947	4,981	2,922	0%	15%	85%	0%	25%	75%	0%	52%	48%
British Airways	2,522	2,685	2,650	0%	50%	50%	0%	43%	57%	0%	23%	77%
United Parcel Service	2,053	2,073	2,096	0%	89%	11%	0%	89%	11%	0%	97%	3%
Air Canada	3,947	1,126	1,908	0%	100%	0%	0%	100%	0%	0%	100%	0%
Aer Lingus	2,011	1,995	1,860	0%	100%	0%	0%	100%	0%	0%	93%	7%
Lufthansa	1,707	1,662	1,703	0%	0%	100%	0%	0%	100%	0%	14%	86%
Virgin Atlantic	764	778	1,361	0%	0%	100%	0%	0%	100%	0%	0%	100%
Frontier Airlines, Inc.	NA	NA	1,211	N/A	N/A	N/A	N/A	N/A	N/A	6%	30%	64%
Hainan Airlines Co. Ltd.	1,032	1,078	1,056	0%	0%	100%	0%	0%	100%	0%	0%	100%
Icelandair	1,265	1,041	1,044	38%	1%	61%	0%	77%	23%	0%	85%	15%
Swiss Air	924	942	978	0%	0%	100%	0%	0%	100%	0%	0%	100%
GoJet Airlines	3,136	2,686	968	0%	100%	0%	0%	100%	0%	0%	100%	0%
Compañía Panameña de Aviación	730	1,100	962	0%	100%	0%	0%	100%	0%	0%	100%	0%

Table 6-15	Airline Operations Percentages in Original Stage 3 or Equivalent Stage 4/5 Aircraft (2017 to 2019) (Continued)											
Airlines with more than 100 flights	**Number of Flights[1]**			**Percentage of Stage 3 or Equivalent Stage 4 or 5 Operations[2]**								
	2017	**2018**	**2019**	**2017 Stage 3**	**2017 Stage 4**	**2017 Stage 5**	**2018 Stage 3**	**2018 Stage 4**	**2018 Stage 5**	**2019 Stage 3**	**2019 Stage 4**	**2019 Stage 5**
Iberia Air Lines of Spain	464	707	859	0%	97%	3%	0%	64%	36%	0%	59%	41%
Air France	884	828	856	0%	32%	68%	0%	36%	64%	0%	7%	93%
SATA International Airlines	844	780	809	0%	89%	11%	2%	8%	90%	0%	1%	99%
Norwegian Air UK Limited	NA	552	732	N/A	N/A	N/A	0%	0%	100%	0%	0%	100%
Qatar Airways	728	734	730	0%	0%	100%	0%	9%	91%	0%	100%	0%
Japan Airlines	730	732	728	0%	0%	100%	0%	1%	99%	0%	0%	100%
Emirates Airlines	1,034	734	719	0%	97%	3%	0%	99%	1%	0%	57%	43%
Atlas Air	652	703	699	0%	100%	0%	0%	100%	0%	0%	100%	0%
TAM- Linhas Aereas S.A.	767	376	697	0%	14%	86%	0%	1%	99%	0%	0%	100%
Hawaiian Airlines	616	644	674	0%	0%	100%	0%	0%	100%	0%	0%	100%
Envoy Airlines	643	642	644	0%	100%	0%	0%	88%	12%	0%	28%	72%
Scandinavian Airlines	548	544	550	0%	99%	1%	0%	100%	0%	0%	100%	0%
Korean Air Lines Co., Ltd.	136	525	531	100%	0%	0%	99%	1%	0%	99%	1%	0%
Expressjet	3,660	2,618	300	0%	42%	58%	0%	32%	68%	0%	0%	100%
El Al Israel Airlines Ltd.	298	288	296	42%	58%	0%	33%	67%	1%	0%	97%	3%
MN Airlines, LLC	1,391	1,030	288	0%	100%	0%	0%	100%	0%	0%	100%	0%
KLM Royal Dutch Airlines	NA	NA	263	N/A	N/A	N/A	N/A	N/A	N/A	0%	98%	2%
Aeromexico	226	501	218	0%	100%	0%	0%	99%	1%	0%	100%	0%
WOW Air, LLC.	724	722	171	98%	2%	0%	99%	0%	1%	85%	0%	15%
Royal Air Maroc	NA	NA	161	N/A	N/A	N/A	N/A	N/A	N/A	0%	0%	100%
TACA International Airlines, S.A.	NA	156	136	N/A	N/A	N/A	0%	57%	43%	0%	84%	16%
TACV-Cabo Verde Airlines	NA	NA	112	N/A	N/A	N/A	N/A	N/A	N/A	0%	48%	52%
Mesa Airlines	327	138	110	28%	72%	0%	25%	75%	0%	17%	83%	0%
Aerovias de Mexico S.A. de C.V.	667	657	NA	0%	100%	0%	0%	100%	0%	N/A	N/A	N/A

Table 6-15 Airline Operations Percentages in Original Stage 3 or Equivalent Stage 4/5 Aircraft (2017 to 2019) (Continued)

	Number of Flights[1]			Percentage of Stage 3 or Equivalent Stage 4 or 5 Operations[2]								
Airlines with more than 100 flights	**2017**	**2018**	**2019**	**2017 Stage 3**	**2017 Stage 4**	**2017 Stage 5**	**2018 Stage 3**	**2018 Stage 4**	**2018 Stage 5**	**2019 Stage 3**	**2019 Stage 4**	**2019 Stage 5**
Primera Air Scandinavia A/S	NA	238	NA	N/A	N/A	N/A	0%	0%	100%	N/A	N/A	N/A
Trans States Airlines, Inc.	NA	228	NA	N/A	N/A	N/A	0%	0%	100%	N/A	N/A	N/A
Thomas Cook Airlines	154	104	NA	0%	1%	99%	0%	0%	100%	N/A	N/A	N/A

Source: Massport and HMMH, 2020.
N/A Not available.
1 Operations for some carriers differ with those in Chapter 2, *Activity Levels*, and Chapter 7, *Air Quality/Emissions Reduction,* because the table only includes jet aircraft, not turboprops, and it includes both scheduled and unscheduled air carriers.
2 Original Stage 3 means originally manufactured as a certificated Stage 3 aircraft under FAR Part 36. Stage 4 equivalent or Stage 5 equivalent means the aircraft meets Stage 4 or Stage 5 requirements, even if it is not certificated as such.

Noise Complaint Line

In 2018, Massport received 71,381 noise complaints from 82 communities, an increase from 59,343 noise complaints from 95 communities in 2017. In 2019, the number of complaint calls rose to 268,929 from 86 communities. The community of Medford generated over 36 percent of the calls in 2019 and has the most unique callers as well as the highest number of complaints. The number of individual complainants decreased from 4,269 callers in 2017 to 2,178 callers in 2018, and then increased again to 2,671 callers in 2019.

Complaints rose significantly in the communities overflown by Runway 33L departures (East Boston, Medford, Arlington, Somerville, Watertown, and Winchester) due to a combination of several factors: an increase in departures from Runway 33L in 2019, increased ability to submit a complaint, and increased public awareness through various community groups. Complaints from communities under the Runway 27 flight path also increased due to similar reasons, including higher use of Runway 27 for departures and increased community awareness.

Recent technological advances in both Massport's noise complaint phone system and online complaint tracking system, as well as the incorporation of third-party complaint applications, have made it easier for community members to file a complaint and to receive information about particular noise events. In late 2018, Massport added the option to submit complaints through the Airnoise button[37] which has dramatically increased complaints logged in the system. In 2017, the average number of complaints per individual caller (the

37 Airnoise is a subscription service that allows the user to file a noise complaint by clicking a button. The system finds the aircraft closest to the complainer and then files a detailed noise complaint directly with Massport. https://www.airnoise.io/

ratio of calls to callers) was 13.9. This ratio increased to an average 32.8 complaints per caller throughout 2018 and then to an average 100.7 complaints per caller in 2019.

Recently, the FAA launched its nationwide Noise Complaint Initiative (NCI) to better engage with communities on noise complaints. This initiative allows the public to submit a noise complaint or inquiry through the FAA Noise Portal, enabling the FAA to respond to noise complaints more efficiently and effectively, working with Massport.

Table 6-16 is a summary of noise complaints from the Massport Noise Abatement Office. The summary table presents the fifteen communities with the greatest number of complaints for each 2018 and 2019, along with the number of callers and the corresponding numbers from 2017. The communities listed below represent 93 percent of the complaints in 2018 and almost 96 percent of the complaints in 2019. All remaining communities are summed together into a single line above the grand total. Appendix H, *Noise Abatement,* has a full listing of the complaints by community.

Table 6-16 Noise Complaint Line Summary

	2017		2018		2019		Change in Calls	
Town	**Calls**	**Callers**	**Calls**	**Callers**	**Calls**	**Callers**	**2017 to 2018**	**2018 to 2019**
Arlington	2,252	137	1,264	50	7,021	77	(988)	5,757
Cambridge	1,657	211	1,118	131	1,958	142	(539)	840
East Boston	312	97	148	56	3,803	70	(164)	3,655
Hull	1,500	175	1,024	101	1,047	97	(476)	23
Hyde Park	132	20	1,308	9	1,514	11	1,176	206
Jamaica Plain	2,016	274	8,395	111	17,132	108	6,379	8,737
Malden	1,987	96	823	36	15,414	34	(1,164)	14,591
Medford	7,856	745	5,857	328	98,021	712	(1,999)	92,164
Melrose	5	2	7	1	1,967	4	2	1,960
Milton	23,940	486	34,902	314	41,575	219	10,962	6,673
Roslindale	2,094	203	1,289	101	2,975	78	(805)	1,686
Roxbury	891	36	990	13	5,151	24	99	4,161
Scituate	8	6	901	5	946	5	893	45
Somerville	3,762	309	2,565	150	28,070	229	(1,197)	25,505
South End	786	135	1,724	43	5,309	27	938	3,585
Watertown	818	65	250	28	3,709	28	(568)	3,459
West Roxbury	1,104	56	2,358	23	5,239	27	1,254	2,881
Winchester	895	111	936	16	9,143	15	41	8,207
Winthrop	293	128	611	171	8,121	201	318	7,510
Total (for towns listed above)	**52,308**	**3,292**	**66,470**	**1,687**	**258,115**	**2,108**	**14,162**	**191,645**
Total Complaints from Other Towns	7,035	977	4,911	491	10,814	561	(2,124)	5,903
Overall Totals	**59,343**	**4,269**	**71,381**	**2,178**	**268,929**	**2,669**	**12,038**	**197,548**

Source: Massport, 2020.
Notes: Changes in ( ) represent a decrease in noise complaints.
The top fifteen communities for each year are listed above. The complete list of complaints is in Appendix H, *Noise Abatement*. In late 2018, Massport added the option to submit complaints through the Airnoise button, which has dramatically increased complaints logged in the system.

Airbus A320 Vortex Generators

Figure 6-20 Vortex Generator Device by Port on Wing

Massport encourages operators to use idle or reduced reserve thrust during landing, and to retrofit the Airbus A319/320/321 family of aircraft with vortex generators, which reduce tonal noise on approach. A vortex generator is a small device that disrupts wind over ports on the wing. Without the device, the wind can produce a "whistling" tone during the aircraft's approach into an airport. These actions are detailed in a letter included in Appendix L, *Reduced/Single Engine Taxiing at Logan Airport Memoranda*, which Massport issued to air carriers at Logan Airport. All Airbus A319/320/321 built after 2014 already come equipped with the Vortex Generator. United Airlines announced it was retrofitting its aircraft in 2017 as they went in for service. In a press release in October 2018, jetBlue Airways (the largest air carrier operator at Logan Airport) announced plans to retrofit its older Airbus fleet with Vortex Generators (see **Figure 6-20** for an example of this). These changes reflect the partnership between Massport and the airlines to reduce aircraft noise to benefit surrounding communities. As airlines retrofit aircraft and transition to the newer models of the A320 family, the number of aircraft operating at Logan Airport without the vortex generators is expected to decrease. The jetBlue press release was published in the Noise Abatement chapter of the *2017 ESPR*.

FAA and Massport RNAV Pilot Project

Over the last several years, the implementation of new PBN procedures – including RNAV – has resulted in a concentration of flights. On October 7, 2016, FAA signed a Memorandum of Understanding (MOU) with Massport[38] to frame the process for analyzing opportunities to reduce noise through changes or amendments to PBN. Massport has been working with FAA and others to develop test projects that are designed to help address the concentration of noise from PBN. Massport has proposed several ideas for a test program with FAA to better define the implications of flight concentration on the community. This program, supported by the FAA, will study possible strategies to address neighborhood concerns. This is a first-in-the-nation project between FAA and an airport operator that includes analyzing the feasibility of changes to some RNAV approaches and departures from Logan Airport. FAA and Massport are committing to: (1) analyze the feasibility; (2) measure and model the benefits and impacts of changing some RNAV approaches; and (3) test and develop an implementation plan, which will include environmental analysis and community/public outreach.

The project has been structured in two phases, or "blocks". Block 1 recommendations are those that would not result in shifting noise from one area to another, and that would not have significant operational/technical implications. Block 2 recommendations could result in noise increases in some areas or face technical barriers

38 Massport. October 7, 2016. *Massport and FAA Work to Reduce Overflight Noise.* https://www.massport.com/news-room/news/massport-and-faa-work-to-reduce-overflight-noise/.

that would require further review. The RNAV technical team, led by MIT, is currently working on Block 2 and has provided updates to the Massport CAC on its progress.

Block 1

A report on Block 1 recommendations was completed in December 2017, and the Massport CAC voted to approve and recommend implementation of the four Block 1 procedures. On December 20, 2017, Massport sent a request for FAA review and implementation of the Block 1 recommendations. A copy of the letter is provided in *2017 ESPR*. FAA review of the four Block 1 recommendations began in 2018 and is still ongoing. Two of the recommendations have not moved forward (restricting climb speed to 220 knots due to flyability issues and modifications to Runway 22 RNAV SIDs due to airspace conflicts). The other two recommendations have progressed; the development of an RNAV visual approach to Runway 33L and the modification of the Runway 15L RNAV SID which would shift departures further away from Hull. The Runway 33L RNAV approach is similar to the jetBlue Airways RNAV visual Special to Runway 33L already in place but would be a published procedure for all airlines to use. A copy of the Massport request to FAA from April 2017 was published in the *2017 ESPR*. Since the Block 1 recommendations were sent, FAA and Massport have further refined the procedures and presented the FAA's recommended options to the Massport CAC in January of 2020. The FAA continues to evaluate these procedures and could publish the procedure in early to mid-2021. On November 12, 2020, Massport submitted a request to the FAA for review and implementation of two procedures at Logan Airport. These include modifying the existing RNAV SID from R15R to move tracks over water, and a new over water RNP approach for users with the capability to utilize this more precise PBN procedure. A copy of this letter is included in **Figure 6-21**.

Block 2

The RNAV study team continues to progress with Block 2 options. Block 2 procedures are more complex due to potential operational/technical barriers or equity issues. Procedures being considered as part of Block 2 are RNAV or Required Navigational Performance (RNP)[39] approaches to Runway 22L and Runway 4R, continuous descent RNAV profiles, heading based departures from Runway 22L and Runway 22R and dispersed headings from Runway 33L and 27. Both Runway 33L, Runway 22L and Runway 22R departure concepts were presented to major airline representatives and FAA in May 2020.

At the request of the Massport CAC, FAA agreed to take an initial look at the feasibility of these options by August 2020. FAA assembled a panel of stakeholders consisting of representatives from the airline industry, the FAA Air Traffic Organization (Mission Support Services, Air Traffic Services, System Operations and the National Air Traffic Controllers Association), the FAA Office of Environment and Energy, and FAA Flight Standards. FAA and industry stakeholders completed their initial review of the proposed procedures and determined that none of the procedures would be recommended for further evaluation. The study team is reviewing this information and reviewing other options. Massport and MIT expect to complete the RNAV study by the end of 2020.

39 Required Navigational Performance (RNP) procedures provide a precise flight path both laterally and vertically for aircraft on approach.

Figure 6-21 Massport Request to FAA for Performance Based Navigation (PBN) Procedures

Massachusetts Port Authority
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Telephone (617) 568-5000
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November 12, 2020

Colleen D'Alessandro
Regional Administrator
Federal Aviation Administration New England Region
1200 District Avenue
Burlington, MA 01803-5299

Re: Request to implement procedures at Boston Logan related to FAA\MPA MOU

Dear Ms. D'Alessandro:

Consistent with the Memorandum of Understanding (MOU) executed in September 2016 between the Federal Aviation Administration (FAA) and the Massachusetts Port Authority (Massport) related to Precision Based Navigation (PBN), I am writing to request that the FAA review and implement the following procedures at Boston Logan International Airport (Boston Logan):

- 1-D2 R15R RNAV SID Modification Final FAA Redesign. This procedure modifies the existing RNAV SID from R15R to move tracks overwater, away from populated areas.
- RNAV R33L RNP Only Option. This is a new overwater RNP approach for users with the capability to utilize this more precise PBN procedure.

These procedures were developed as part of the MOU which outlines the actions that Massport and the FAA intend to undertake in seeking reductions to overflight noise impacts of aircraft operations at Logan Airport that result from the FAA's implementation of NexGen PBN procedures including RNAV. These two procedures were originally designed by Massachusetts Institute of Technology (MIT), revised with FAA input, and approved by the Massport Community Advisory Committee (MCAC) at their quarterly meeting on November 5, 2020.

It is our hope that the FAA will be able to undertake final review and publish these procedures as expeditiously as possible.

On behalf of Massport, I want to thank the FAA for its commitment to this very important and unique study, the MIT team for their innovative technical work, and the MCAC for their constructive engagement. Please feel free to contact me directly or Flavio Leo, Director of Aviation Planning and Strategy, with any further questions.

Sincerely,

Edward C. Freni
Director of Aviation
Massachusetts Port Authority

Cc: K. Knopp (FAA), D. Carlon (MCAC), J. Hansman (MIT), L. Wieland, F. Leo, A. Coppola

Reduced Engine Taxiing

Single or reduced engine taxiing has the potential to reduce noise at Logan Airport. When used, the largest benefit is achieved by reducing the use of the engines on the side of the aircraft closest to the community. However, this is not always practicable due to airline procedures, taxiway routings, and safety considerations. Massport has reached out to the airlines and encouraged the use of this procedure whenever practicable. The letter sent to airport users for 2018 and 2019 from Massport is published in Appendix L, *Reduced/Single Engine Taxiing at Logan Airport Memoranda*.

In 2009, MIT, in cooperation with Massport and the FAA, conducted a survey of pilots at Logan Airport and found that the procedure was widely used on arrivals but not frequently used on departures.[40] Key reasons cited for not using the procedure were safety-related or practical reasons such as a short taxi time. The survey indicated that for the procedure to be considered for arrivals, the taxi-in time would have to exceed 10 minutes and for departures, exceed 20 minutes. The average taxi-out times for Logan Airport exceeding 20 minutes generally occur during two periods of the day; in the morning for 2017 and 2018 between 6:00 to 8:00 AM and for 2019 between 6:00 to 9:00 AM, and in the evening for 2017, 2018, and 2019 between 5:00 and 8:00 PM. During 2017, 2018, and 2019, the average taxi-in time only exceeded 10 minutes during the 6:00 to 8:00 PM period in 2019. The average taxi-out time at Logan Airport increased over the three-year period from 2017 to 2019 (19.1 minutes in 2017, 19.2 minutes in 2018, and 19.4 minutes in 2019). The average taxi-in time also increased over the three-year period (7.5 minutes in 2017, 8.1 minutes in 2018, and 8.6 minutes in 2019). Overall, the average taxi/delay time increased over the three-year period (13.3 minutes in 2017, 13.6 minutes in 2018, and 14.0 minutes in 2019).[41] These small changes year to year occur due to several factors such as changes in levels of operations, flight schedules, weather, and use of the runways. Mandatory single engine taxiing was also one of the proposed measures in the BLANS but was rejected by FAA due to safety concerns.

FAA Runway 4L RNAV Approach Environmental Assessment (EA)

The FAA is developing an improved approach procedure to Runway 4L. Runway 4L is currently only available during visual weather conditions and an improved approach procedure would allow Runway 4L to be available during reduced weather conditions. This procedure was originally evaluated in 2015 during a temporary test and the FAA committed at that time to conduct an Environmental Assessment (EA). The test and evaluation were reported in the *2015 EDR*.

The FAA has developed an EA to support a permanent RNAV Runway 4L approach procedure which will provide a de-conflicted stabilized approach procedure that provides vertical and lateral guidance when weather or winds require aircraft to land on Runway 4L. The FAA began this process in October 2019 and provided a status presentation to the Massport CAC during its January 2020 meeting. The Draft EA was available for public review and public workshops were held by the FAA in the October 2020.

40 The full report was published in the *2009 EDR* in Appendix L, *Survey of Airline Pilots Regarding Fuel Conservation Procedures for Taxi Operations*.

41 FAA Aviation System Performance Metrics: Avg. Taxi Time: Standard Report.

Sound Insulation Program Contour

Massport continues to engage with the FAA regarding homes that may be eligible for mitigation from noise levels greater than or equal to DNL 65 dB. As of 2015, the FAA requires airports to use the AEDT model to establish eligibility for sound insulation; therefore, in 2019, Massport updated its RSIP Noise Exposure Map contours and submitted an AEDT-derived noise exposure map to FAA in 2020 for review and discussion. The FAA requires that a submitted sound insulation program contour should represent current operational conditions; generally, the contour year should match the date of the document submittal. However, due to the significant decrease in 2020 operations caused by the COVID-19 pandemic, Massport developed a 2019 RSIP forecast contour including block rounding representing pre-COVID conditions to comply with this requirement and submitted it to FAA in the summer of 2020. Once accepted by the FAA, Massport will reach out to eligible homeowners to discuss potential mitigation options for their homes, subject to federal and Massport funding availability.

In January 2020, Massport's CEO sent a letter to the FAA Associate Administrator requesting that Massport and the FAA work together to address re-treatment of homes that were sound insulated during the early years of the program to upgrade eligible homes to newer more effective and durable materials. The Associate Administrator responded that the FAA is exploring limited circumstance under which Massport might be able to mitigate homes that had been mitigated before the FAA first issued sound insulation standards in 1993. The status of the initiative will be reported in future EDRs. See Appendix H, *Noise Abatement* for additional information.

Ongoing Noise Studies

Massport keeps up to date with noise related studies and requirements undertaken by the FAA, academia, and other entities. As part of the October 2018 FAA Reauthorization, FAA was directed to address issues related to aviation noise research including:

- Sec. 173. Alternative Airplane Noise Metric Evaluation Deadline: Requires FAA to complete research on alternative noise metrics as a possible replacement to DNL within one year. FAA forwarded its Report to Congress in April 2020 as described under Noise Metrics above.
- Sec. 187. Aircraft Noise Exposure: Requires that the FAA complete "ongoing review of the relationship between aircraft noise exposure and its effects on communities" within two years. It specifically requires FAA to revise its Part 150 land use compatibility guidelines (14 CFR 150). FAA has not yet released this report.
- Sec. 189. Study on Potential Health and Economic Impacts of Overflight Noise: Requires FAA to engage a university to conduct a health study in a number of metropolitan areas (Boston, Chicago, the District of Columbia, New York, the Northern California Metroplex, Phoenix, the Southern California Metroplex, Seattle, or such other area as may be identified by the FAA), focusing on: "incremental health impacts on residents living partly or wholly underneath flight paths most frequently used by aircraft flying at an altitude lower than 10,000 feet, including during takeoff or landing"; and "an assessment of the relationship between a perceived increase in aircraft noise, including as a result of a change in flight

paths that increases the visibility of aircraft from a certain location, and an actual increase in aircraft noise, particularly in areas with high or variable levels of non-aircraft-related ambient noise." FAA has initiated a study on cardiovascular disease and aircraft noise exposure through its ASCENT Center of Excellence for Alternative Jet Fuels and Environment; the research is being led by Boston University.

The FAA has a number of ongoing research studies aimed to support policymaking around aviation noise:

- The Neighborhood Environmental Survey: is a multi-year effort to update the scientific evidence on the relationship between aircraft noise exposure and its effects on communities around airports. This is the study referenced in FAA Reauthorization Section 187.
- ASCENT research on sleep disturbance: The long-term goal of this project is to understand the relationship between aircraft noise and sleep disturbance in the United States. This project's researchers are investigating the use of actigraphy and electrocardiography as a cost-effective tool for studying large cohorts of people.

In addition to tracking FAA-related studies, Massport is also closely following international research on the state of the science around effects of aircraft noise on people including:

- The International Civil Aviation Organization's (ICAO) Committee on Aviation Environmental Protection (CAEP) issued a paper entitled *Aviation Noise Impacts White Paper State of the Science 2019: Aviation Noise Impacts in 2019*. The paper contains information on impacts including community noise annoyance, sleep disturbance, health impacts, children's learning, helicopter noise, supersonic aircraft, urban air mobility, and unmanned aerial systems. The paper also considers the economic costs of aviation noise.
- The World Health Organization (WHO) Europe issued Environmental Guidelines for the European Region in 2018 to support legislation and policymaking in Europe. They are identified as "strong recommendations" but have been criticized because in many cases the strong recommendations are based on weak data.
- Most recently, the UK Independent Commission on Civil Aviation Noise published a report entitled *Aviation noise and public health: Rapid evidence assessment*, which evaluates the quality of evidence for WHO findings and identifies research gaps.

Noise Abatement Management Plan

Massport's noise abatement goals are achieved through the implementation of multiple elements. **Table 6-17** lists these goals and the associated plan elements and reports on progress toward achieving these goals.

Table 6-17 Noise Abatement Management Plan

Noise Abatement Goal	Plan Elements	2018/2019 Progress Report
Limit total aircraft noise	Limit on Cumulative Noise Index (CNI)	The CNI value for 2018 was 153.4 EPNdB and for 2019 was 153.5 EPNdB which is well below the cap of 156.5 EPNdB.
	Stage 3 percentage Requirement in Noise Rules	In 2018 and 2019, 100 percent of Logan Airport's total commercial jet traffic satisfied Stage 3 noise criteria or better. The newest Stage 5 category comprised 15 percent of these operations for both years.
Mitigate noise impacts	Residential Sound Insulation Program (RSIP)	No additional dwelling units were sound insulated in 2018 or 2019, leaving the total of treated dwelling units at 11,515 since the start of the program in 1986, with over $170 million invested. See Appendix H, *Noise Abatement,* for additional details. In 2019, Massport updated its RSIP Noise Exposure Map contours and submitted an AEDT-derived noise exposure map to the FAA in 2020 for review and discussion.
	School Sound Insulation Program	Thirty-six eligible schools have been sound insulated since this program began.
	Noise Abatement Arrival and Departure Procedures	Flight track monitoring and data analysis were used to verify adherence to noise abatement flight procedures. See Appendix H, *Noise Abatement,* for data from the 2018 and 2019 Monitoring Reports.
	Preferential Runway Advisory System (PRAS) Runway End Use Goals	Massport continues to report on effective runway use and compare the results to PRAS goals despite that program no longer being in effect.
	Runway Restrictions	Noise-based use restrictions 24 hours per day on departures from Runway 4L and arrivals on Runway 22R were continued.
	Reduced-Engine Taxiing	Voluntary use of reduced-engine taxiing is encouraged when appropriate and safe. See Appendix L, *Reduced/Single Engine Taxiing at Logan Airport Memoranda,* for information.

Table 6-17 Noise Abatement Management Plan (Continued)

Noise Abatement Goal	Plan Elements	2018/2019 Progress Report
Continue to Improve the Noise Monitoring System	Evaluate current system and update system as needed	In 2018, Massport did a thorough review of its current noise monitoring system and went out to bid for an upgraded system. The prior vendor L3Harris was selected and in 2019, L3Harris began upgrading the system and has upgraded six noise monitors.
Minimize nighttime noise	Nighttime Stage 2 Aircraft Prohibition	With the FAA's ban on all Stage 2 operations after December 31, 2015, this prohibition is no longer necessary.
	Nighttime Runway Restrictions	Prohibitions on use of Runway 4L for departures and Runway 22R for arrivals between 11:00 PM and 6:00 AM were continued.
	Maximization of Late-Night Over-Water Operation	Efforts to maximize late-night over-water operations were continued. Use of Runway 15R for departures and Runway 33L for arrivals continued.
Minimize nighttime noise (continued)	Nighttime Engine Run-up and auxiliary power unit (APU) Restrictions	Restriction on nighttime engine run-ups and use of APUs was continued.
Address/respond to noise issues and complaints	Noise Complaint Line	Massport continued operation of its Noise Complaint Line, (617) 561-3333.
	Special Studies	Massport continued to provide technical assistance and analysis using noise monitoring system to support the FAA and others in monitoring jet departure tracks from Runway 27 and Runway 33L. Massport and the FAA are conducting an RNAV evaluation project designed to identify ways to reduce noise from the RNAV procedure (which concentrates flights). Massport is working with ASCENT on two research project concerning aircraft noise and flight procedures. Massport continues to support research at the federal level including Boston University/Tufts University FAA ASCENT research

Source: Massport.

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Air Quality/Emissions Reduction

This EDR focuses primarily on calendar years 2018 and 2019, however, due to the dramatic effects of the COVID-19 pandemic in 2020, Massport has strived to include relevant updates through October 2020. Beginning in March 2020, flights in and out of Logan Airport were dramatically reduced and passenger levels dropped by over 90 percent at the peak of the pandemic in the spring and summer of 2020. As a result, there are far fewer aircraft operations and passengers and a dramatic drop in overall Logan Airport activity. While activity levels began a slow recovery in mid-summer 2020, the ongoing wave of COVID-19 cases has resulted in continued historically low levels of activity, with a full recovery years away. As of October 2020, total flight operations for the year were down by 50 percent and passenger levels were down by about 70 percent compared to January through October 2019. Massport expects that by the end of 2020, passenger levels will have dropped to levels of activity not seen since the mid-1970s.

Reductions in aircraft operations and ground access trips will likely result in reduced emissions in 2020. Additionally, several airlines have retired larger and older aircraft models such as Airbus A330 and A380, Boeing 747, 757, 767, and MD-88, Embraer 190, and the smaller CRJ200 regional jet. When traffic volumes return, it is anticipated that the mix of aircraft types, which affects air quality, will be different than the aircraft mix in this EDR. The severity and duration of the contraction in aircraft operations and air travel are unknown at this time and cannot be reasonably estimated until more certainty regarding the re-opening of cities, states, and the country is known. However, over the long term, it is expected that demand and airline capacity will grow in line with the U.S. economy. Forthcoming EDRs will continue to provide updates, as available. Massport continues to carefully review Airport activity levels and remains committed to implementing project-related mitigation strategies, as documented in Chapter 9, *Environmentally Beneficial Measures and Project Mitigation Tracking*.

Key Findings for 2018 and 2019

- The Massachusetts Port Authority's (Massport's) air quality management strategy for Boston Logan International Airport (Logan Airport or the Airport) focuses on decreasing emissions from Airport-related sources. Key Massport initiatives to reduce air emissions from Airport operations include:
  - Replacement of gas- and diesel-powered ground service equipment (GSE) with electric equivalents by the end of 2027, where commercially available;
  - Commitment to Leadership in Energy and Environmental Design (LEED®) and other sustainable building standards;
  - Investment in renewable energy installations on-Airport (solar/wind);
  - Use of clean-fuel shuttle buses; and
  - Implementation of extensive strategies to promote high occupancy vehicle (HOV) use and ground transportation improvements.

- Total modeled emissions of carbon monoxide (CO), particulate matter (PM_{10}/$PM_{2.5}$),[1] and oxides of nitrogen (NO_X), increased from 2017 to 2018 by approximately 14 percent, 17 percent, and 4 percent, respectively. Volatile organic compounds (VOCs) remained consistent. These increases were mainly attributable to the 5.6 percent increase in aircraft operations in 2018 compared to 2017. Variations in emissions were also due to airframe/engine combination parameters included in the two model versions used and the associated differences in applied emission factors assumed in the models.

- In 2019, total modeled emissions of CO, PM_{10}/$PM_{2.5}$, and VOCs each increased by about 2 percent from 2018. NO_X emissions instead increased by about 5 percent. These changes are also due to an increase in aircraft operations of 0.7 percent as well as slight variations in the aircraft fleet mix from 2018 to 2019. Additionally, increases in NO_X emissions in 2019 are associated with higher stationary source fuel usages in that year.

- Modeled emissions of CO, VOC, and NO_X associated with GSE and motor vehicles, many of which Massport has influence, have declined from 2018 to 2019. Emissions of PM_{10}/$PM_{2.5}$ remain steady. While there are model version differences between 2017 and 2018, causing variances in emissions between those years, overall GSE and motor vehicles show a decreasing trend from 2017 to 2019 for all pollutants.

- Total Logan Airport greenhouse gas (GHG) emissions increased from 2017 to 2018 by approximately 10 percent and from 2018 to 2019 by approximately 4 percent. These increases are primarily due to the increase in aircraft operations (i.e., 5.6 percent in 2018 and 0.7 percent in 2019). GHG emissions associated with Logan Airport in 2018 and 2019 are approximately 1 percent of the most recent statewide emissions estimates.[2]

1 Particulate matter (PM) less than or equal to 10 microns (PM_{10}) and PM less than or equal to 2.5 microns ($PM_{2.5}$) are subsets of PM.
2 MassDEP, *Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2017*, available at https://www.mass.gov/lists/massdep-emissions-inventories#greenhouse-gas-baseline,-inventory-&-projection.

Introduction

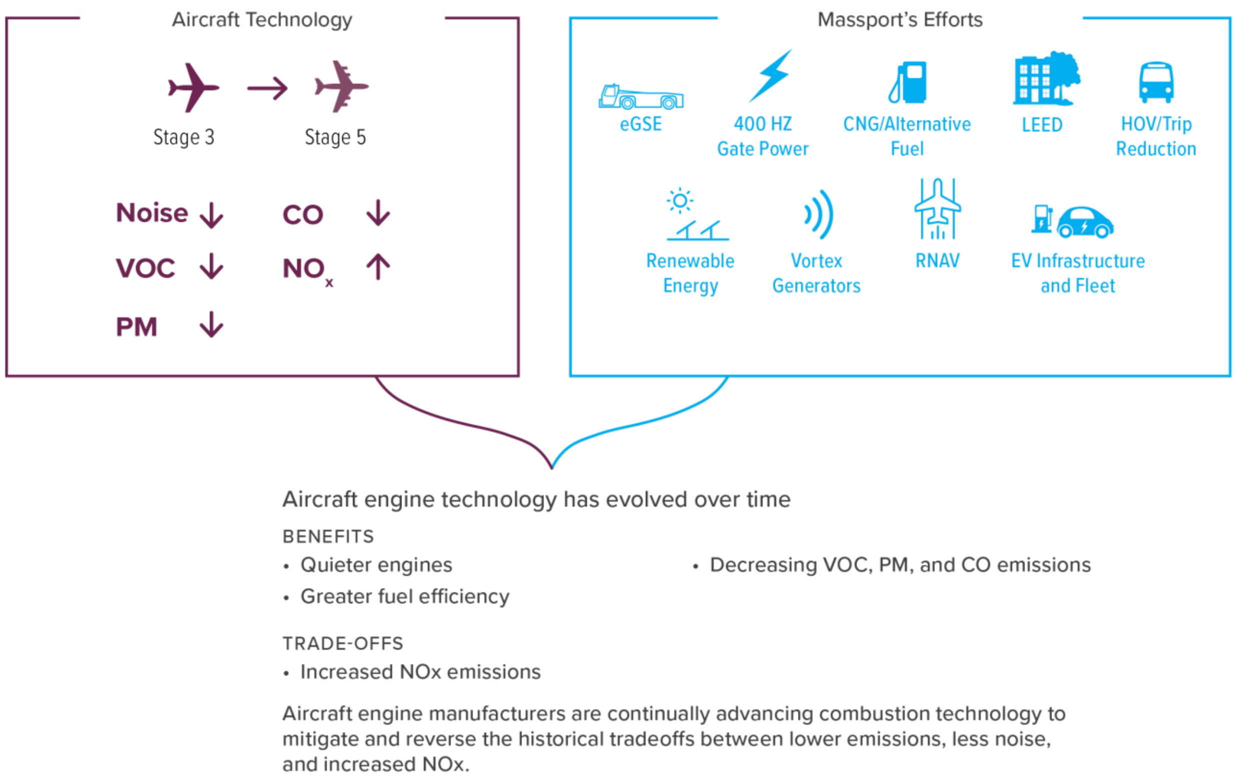
Massport is a national leader in studying, tracking, and reporting on the air quality environment of Logan Airport, and in implementing measures to reduce emissions. Recognized as early as 2008 with an environmental award for Logan Airport's Emissions Reduction Program, Massport annually prepares an inventory of Airport-related emissions of the U.S. Environmental Protection Agency (EPA) criteria air pollutants (and their precursors) including CO, NO_X, $PM_{10}/PM_{2.5}$, and VOCs as well as GHGs. This chapter describes air quality conditions at Logan Airport during the 2018 and 2019 time period and compares them to their respective prior year inventories.

As reported in previous Environmental Data Reports (EDRs) and Environmental Status and Planning Reports (ESPRs), total emissions at Logan Airport on a per passenger basis have steadily decreased over the past decade. This long-term downward trend is consistent with Massport's longstanding objective to accommodate the demands of increasing passenger and cargo activity levels with fewer aircraft operations and reduced emissions.

When compared to previous inventories, the changes in CO, VOC, and $PM_{10}/PM_{2.5}$ air emissions in 2018 and 2019 are well within expected values given the corresponding increase in aircraft operations. Notably NO_X emissions have increased primarily because the majority of NO_X emissions from aircraft originate from high-temperature, high-pressure reactions of atmospheric nitrogen in aircraft engines. Over time, aircraft engine technology has evolved to be more fuel-efficient, less polluting, and quieter, in large part due to improved fuel combustion under these higher temperature and pressure conditions. This interdependency (or trade-off) between increased NO_X, less noise, better fuel efficiency, and generally lower emission factors for other pollutants, is an inevitable outcome of the modernization of the commercial air carrier fleet. Aircraft engine manufacturers are continually advancing combustion technology that is designed to mitigate and reverse the historical tradeoffs between less noise, lower emissions, and increased NO_X. This trend is likely to continue in the future. Presently, NO_X emissions at Logan Airport represent approximately 2 percent of Massachusetts state-wide NO_X emissions in 2018 and 2019.[3]

3 MassDEP, *Massachusetts Reasonably Available Control Technology State Implementation Plan Revision For the 2008 and 2015 Ozone National Ambient Air Quality Standards*, October 18, 2018.

Figure 7-1 Aircraft Engine Technology Has Evolved Over Time



Since Massport does not have direct control over aircraft operations or fleet choices by the airlines, it continues to focus on areas that it controls in order to maximize the reduction of emissions from those sources it has an opportunity to influence. These include the following:

- Provide pre-conditioned air (PCA) and 400-Hertz (Hz) power at all aircraft contact gates to reduce aircraft idling and auxiliary power unit (APU) use.
- Facilitate the replacement of gas- and diesel-powered GSE with electric equivalents by the end of 2027, where commercially available.
- Encourage single engine taxiing procedures by the airlines to reduce both noise and air emissions.
- Install electric vehicle (EV)-charging stations to accommodate vehicles in the Central Garage and Terminal B parking areas. Massport has increased the availability of EV charging stations so that 150 percent of demand is currently available at all facilities; Massport will continue to evaluate as passenger activity levels return.
- Support the use of alternative fuel vehicles (AFVs) by replacing older fleets with alternative fuel fleets.
- Operate one of the largest privately operated, publicly accessible, compressed natural gas (CNG) stations in New England.
- Installing charging stations to support use of battery powered tugs and belt loaders for the ground service fleet throughout the Airport.

One central element of Massport's emissions reduction initiative is a comprehensive strategy to diversify and enhance ground transportation options for passengers and employees and efficiently moving vehicles while they are on-Airport. Massport is committed to reducing vehicle miles traveled (VMT) and associated emissions on Massport-controlled ground transport facilities (such as roadways and curbsides, parking facilities, and vehicle staging areas), as well as reducing VMT by Airport users traveling to and from the Airport. In addition to reducing VMT, on-Airport vehicle circulation improvements are underway. Massport's ground transportation strategy is designed to help reduce automobile-related air emissions and improve air quality by providing a broad range of HOV, public transit, and shared-ride options for travel to and from Logan Airport. The strategy also aims to reduce drop-off/pick-up modes by providing parking on-Airport for passengers choosing to drive or with limited HOV options. Continuing improvements to support HOV include: evaluating new Logan Express service offerings, investing in existing Logan Express sites (e.g., increasing parking capacity, increasing service frequency), implementing priority security lines for Logan Express riders, reducing urban Logan Express fares, and providing free Massachusetts Bay Transportation Authority (MBTA) Silver Line outbound boarding (from Logan Airport) and free Back Bay Logan Express outbound fares. Due to the ongoing COVID-19 pandemic, the public's interest in using HOV transportation services has been significantly affected by concerns about COVID-19. Massport continues to evaluate and plan for the recovery of air passenger activity and remains committed to implementing a broad range of ground access strategies. Massport continues to carefully review both on and off-Airport activity levels and will adjust its ground access programs to align with ridership levels.

By enhancing the Airport roadway system, vehicles are able to circulate more efficiently, resulting in lower overall emissions. Within the parameters of the Logan Airport Parking Freeze, additional on-Airport parking is also being planned at the Terminal E surface lot and Economy Garage. Design of the first 2,000 spaces to be constructed in a garage atop the existing surface lot across from Terminal E is underway, however, following the drop in passenger activity due to the COVID-19 pandemic, construction of the garage in front of Terminal E has been deferred. Providing additional parking is designed to reduce drop-off/pick-up activity to and from the Airport, reduce regional VMT and emissions, and aid in on-Airport circulation efficiency. Chapter 5, *Ground Access to and from Logan Airport,* provides detailed information on Massport's ground access and parking management strategy.

Massport also supports the use of alternative fuels by taxis; provides an on-Airport public-use, CNG station; provides electric plug-ins for electric GSE (eGSE); and installs and maintains 400-Hz power and PCA at all airplane contact gates to help reduce aircraft emissions. Currently, there are twelve charging stations installed at Logan Airport's RideApp (formerly known as transportation network companies [TNC]), black car limousine, and taxi sites. Further, Massport continues to invest in energy efficiency measures, such as the installation of solar panels and constructing facilities to meet the U.S. Green Building Council's (USGBC) LEED® standards. Together, these improvements help to reduce emissions associated with Logan Airport.

In addition to Massport's initiatives, airlines operating at Logan Airport are doing their part in reducing emissions. For example, jetBlue Airways has achieved carbon-neutral flying on all its domestic services. The airline is offsetting emissions for all domestic flights and investing in sustainable aviation fuel.[4]

4 AirlineRating, *Jetblue Achieves Carbon Neutral Flying on all Domestic Services*, https://www.airlineratings.com/news/jetblue-achieves-carbon-neutral-flying-domestic-services/.

Regulatory Framework

The federal Clean Air Act (CAA), National Ambient Air Quality Standards (NAAQS), and similar state laws govern air quality issues in Massachusetts. The NAAQS and the Massachusetts State Implementation Plan (SIP), which describes measures that the State will take to maintain and attain NAAQS compliance, regulate air quality issues in the Boston metropolitan area and the state. These regulations are discussed in the sections that follow.

National Ambient Air Quality Standards (NAAQS)

The EPA established NAAQS for a group of criteria air pollutants to protect public health, the environment, and quality of life from the detrimental effects of air pollution. These NAAQS are set for the following six pollutants, known as "criteria air pollutants", CO, lead (Pb), nitrogen dioxide (NO_2), ozone (O_3), PM_{10}/$PM_{2.5}$, and sulfur dioxide (SO_2). The NAAQS primary standards (designed to protect human health) and secondary standards (designed to protect human welfare) are summarized in **Table 7-1**.

Based on state air monitoring data, and in accordance with the CAA, all areas within Massachusetts are presently designated as either Attainment and/or Maintenance with respect to the NAAQS.[5,6] These regulatory designations for the Boston metropolitan area (including the area around Logan Airport) are listed in **Table 7-2**.

5 EPA, *Nonattainment Areas for Criteria Pollutants (Green Book)*, available at https://www.epa.gov/green-book.

6 An area with air quality levels that meet or are below the NAAQS is designated as attainment; an area with air quality levels that area above the NAAQS is designated as nonattainment; and an area that is in transition from nonattainment to attainment is designated as maintenance. An area may also be designated as unclassifiable when there is lack of data to form a basis for determining attainment status. Nonattainment areas can be further classified as extreme, severe, serious, moderate, and marginal by the degree of non-compliance with the NAAQS.

Table 7-1 National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary/ Secondary	Averaging Time	Standard ppm	Standard μg/m³	Notes
Carbon Monoxide (CO)	Primary	1 hour	35	40,000	Not to be exceeded more than once a year.
		8 hour	9	10,000	Not to be exceeded more than once a year.
Lead (Pb)	Primary and Secondary	Rolling 3-Month Average[1]	—	0.15	Not to be exceeded.
Nitrogen Dioxide (NO_2)	Primary	1 hour	0.100	188	The 98th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
	Primary and Secondary	1 year	0.053	100	Annual mean.
Ozone (O_3)	Primary and Secondary	8 hour[2]	0.070	—	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.
Particulate Matter with a diameter ≤10 μm (PM_{10})	Primary and Secondary	24 hour	—	150	Not to be exceeded more than once per year on average over 3 years.
Particulate Matter with a diameter ≤2.5 μm ($PM_{2.5}$)	Primary and Secondary	24 hour	—	35	The 98th percentile, averaged over 3 years.
	Primary	1 year	—	12	The annual mean, averaged over 3 years.
	Secondary	1 year	—	15	The annual mean, averaged over 3 years.
Sulfur Dioxide (SO_2)	Primary	1 hour[3]	0.075	196	The 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
	Secondary	3 hour	0.5	1,300	Not to be exceeded more than once per year.

Source: EPA, 2020 (https://www.epa.gov/criteria-air-pollutants/naaqs-table).

Notes: There is no NAAQS standard for NO_X.

μm – micrometers; μg/m³ – micrograms per cubic meter; and ppm – parts per million.

1 In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 μg/m³ as a calendar quarter average) also remain in effect.

2 Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standard additionally remains in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

3 The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2) any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a SIP call under the previous SO_2 standards (40 CFR 50.4(3)). A SIP call is an EPA action requiring a state to resubmit all or part of its SIP to demonstrate attainment of the required NAAQS.

Table 7-2 Attainment/Nonattainment Designations for the Boston Metropolitan Area

Pollutant	Designation
Carbon Monoxide (CO)	Maintenance[1]
Nitrogen Dioxides (NO_2)	Attainment
Ozone (8-hour, 2008 Standard)	Attainment
Ozone (8-hour, 2015 Standard)	Attainment
Particulate Matter (PM_{10})	Attainment
Particulate Matter ($PM_{2.5}$)	Attainment
Sulfur Dioxide (SO_2)	Attainment
Lead (Pb)	Attainment

Source: EPA, 2020 (https://www.epa.gov/green-book).
1 The Boston metropolitan area was previously designated Nonattainment for this pollutant but has since maintained compliance with the NAAQS.

Historically, the entire Boston metropolitan area was designated as "Attainment" for all criteria air pollutants except CO and O_3. Currently, the Boston metropolitan area is designated by the EPA as "Maintenance" for CO, indicating that it has maintained attainment of the CO NAAQS. Monitored levels are currently less than 25 percent of the standard and continue to decline.[7] For O_3, the area was previously designated as "Serious/Nonattainment" for the former 1979 1-hour O_3 NAAQS, and "Moderate/Nonattainment" for the 1997 8-hour O_3 NAAQS, which encompassed 10 counties in Massachusetts: Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, and Worcester.[8] Notably, the 1-hour Ozone (1979) standard was revoked on June 15, 2005 and the 8-hour Ozone (1997) standard was revoked on April 6, 2015, but due to "Anti-Backsliding" requirements of the CAA (a rule established to ensure that air quality is not deteriorated due to changes in the NAAQS) still obligates the Massachusetts Department of Environmental Protection (MassDEP) to enforce certain elements of the SIP that were established to attain the O_3 NAAQS.

In April 2012, EPA also implemented the newer, stricter, 2008 8-hour O_3 NAAQS. Since that time, there have been no violations of this standard and this trend has continued through 2019. Based on these recent findings, MassDEP submitted the SIP for O_3 to EPA in 2014 for "Adequacy Review" and in February 2018 received certification that its existing emission statement program satisfies the CAA requirements for the 2008 O_3 NAAQS. Therefore, the Boston metropolitan area is presently designated as "Attainment" with respect to the 2008 O_3 standard.

Finally, effective in 2015, the EPA revised the 2008 8-hour O_3 standard from 0.075 to 0.070 parts per million (ppm). The air quality designations under the stricter 2015 O_3 standard were made in 2018 and based on each area's prior three years of available statewide monitoring data, as required by the EPA.

7 MassDEP, *Revision to the Massachusetts State Implementation Plan for Carbon Monoxide Second 10-Year Limited Maintenance Plan for the Boston Metropolitan Area, Lowell, Springfield, Waltham, and Worcester*, February 9, 2018.
8 Logan Airport is located in Suffolk County.

EPA has designated all of Massachusetts, including the Boston metropolitan area, as Attainment for the 2015 8-hour O_3 standard. However, since Massachusetts is located within the Ozone Transport Region (OTR),[9] it must comply with Reasonably Available Control Technology (RACT) requirements under the 2008 and 2015 O_3 NAAQS regardless of its designated Attainment status.

Currently, there are no state or federal air quality standards for outdoor levels of ultrafine particles (UFPs). Massport is actively tracking the research and regulatory status of this pollutant and will comply with future UFP standards if promulgated by EPA.

Massachusetts State Implementation Plan (SIP)

The Massachusetts SIP is the State's regulatory plan for bringing Nonattainment areas into compliance with the NAAQS. **Table 7-3** provides a listing of the most current SIPs applicable to the Boston metropolitan area.

The number of commercial and employee parking spaces allowed at Logan Airport is regulated by the Logan Airport Parking Freeze (310 Code of Massachusetts Regulations 7.30), which is an element of the Massachusetts SIP under the CAA (42 U.S.C. §7401 et seq. [1970]). The intent of the Logan Airport Parking Freeze is to reduce air emissions by shifting air passengers to travel modes that require fewer vehicle trips. However, survey data since the 1970s has consistently shown that constrained parking has the unintended consequence of shifting air passengers to travel modes with higher numbers of vehicle trips, despite Massport's extensive efforts to provide and encourage the use of HOV travel modes. An amendment to increase the Logan Airport Parking Freeze by 5,000 on-Airport commercial parking spaces was finalized on March 6, 2018 and went into effect on April 5, 2018. For additional information, see Chapter 5, *Ground Access to and from Logan Airport*.

9 Ozone can travel with the wind over long distances, creating air quality problems far downwind of pollution sources and can be transported across state borders. Therefore, the Ozone Transport Commission (OTC), which is a multi-state organization, was created under the Clean Air Act (CAA). The OTC is responsible for advising EPA on transport issues and for developing and implementing regional solutions to the ground-level ozone problem in the Northeast and Mid-Atlantic regions known as the Ozone Transport Region (OTR). The OTR encompasses 11 states, including Massachusetts. The CAA sets out specific requirements for the OTR states. These entail submitting a SIP and installing a certain level of controls for the pollutants that form ozone (VOC and NO_X), even if they meet the ozone standards.

Table 7-3 State Implementation Plan (SIP) for the Boston Metropolitan Area

Standard	**Title**	**Status**	**Comments**
Carbon Monoxide (CO)	Maintenance Plan	Published February 2018	This second 10-year Maintenance Plan is required for any area that was formerly designated as nonattainment to show that it will not regress to this status. This maintenance plan meets the requirements of Section 175A of the Clean Air Act (CAA) and conforms to U.S. Environmental Protection Agency (EPA) guidance for CO maintenance plans.[1]
Ozone (O_3)	2008 SIP	Certified February 2018	In February 2018, the Massachusetts Department of Environmental Protection's (MassDEP's) transport SIP was certified. This Certification fulfilled the interstate transport requirements in Section 110(a)(2)(D)(i) of the CAA and completed MassDEP's Infrastructure SIP Certification in accordance with Sections 110(a) (1) and (2) of the CAA for the 2008 ozone NAAQS.[2]
Ozone (O_3)	2015 SIP	Certified September 2018	In October 2015, EPA lowered (i.e., made stricter) the National Ambient Air Quality Standards (NAAQS) for O_3. In September 2018, MassDEP's infrastructure SIP was certified. This certification fulfilled the infrastructure requirements of CAA Sections 110(a)(1) and (2), as well as interstate transport requirements in Section 110(a)(2)(D)(i).[3]
Ozone (O_3)	2008 and 2015 SIP	Published October 2018	MassDEP has prepared this revision to the Massachusetts SIP to address Reasonably Available Control Technology (RACT) requirements for the 2008 and 2015 8-hour ozone NAAQS. For certain source categories, MassDEP is submitting regulations that establish new or more stringent RACT controls. For other source categories, MassDEP is certifying that previously adopted RACT regulations and controls represent RACT for implementing the 2008 and 2015 ozone NAAQS.[4]

Source: MassDEP (https://www.mass.gov/lists/massachusetts-state-implementation-plans-sips#ozone-sip-).

Notes: The number of commercial and employee parking spaces allowed at Logan Airport is regulated by the Logan Airport Parking Freeze (310 Code of Massachusetts Regulations 7.30 and 40 Code of Federal Regulations 52.1120), which is an element of the State Implementation Plan (SIP) under the federal Clean Air Act (CAA).

CAA – Clean Air Act, EPA – Environmental Protection Agency, CO – Carbon Monoxide, SIP – State Implementation Plan, NAAQS – National Ambient Air Quality Standards, and RACT – Reasonably Available Control Technology.

1 MassDEP, *Second 10-Year Limited Maintenance Plan for the Boston Metropolitan Area, Lowell, Springfield, Waltham, and Worcester*, February 9, 2018.

2 MassDEP, *Certification of Adequacy of the Massachusetts State Implementation Plan with Clean Air Act Section 110(a)(2)(D)(i) Interstate Air Pollution Transport Requirements for the 2008 Ozone National Ambient Air Quality Standards*, February 9, 2018.

3 MassDEP, *Certification of Adequacy of the Massachusetts State Implementation Plan Regarding Clean Air Act Sections 110(a)(1) and (2) for the 2015 Ozone National Ambient Air Quality Standards*, September 27, 2018.

4 MassDEP, *Massachusetts Reasonably Available Control Technology State Implementation Plan Revision For the 2008 and 2015 Ozone National Ambient Air Quality Standards,* October 18, 2018.

Logan Airport Air Quality Permits for Stationary Sources of Emissions

Massport was originally granted a Title V Air Quality Operating Permit for Logan Airport in September 2004, and the most recent renewal was issued in July 2015. Presently, Massport is in the process of renewing its Title V Operating permit. This permit covers all of the Massport-operated stationary sources including the Central Heating and Cooling Plant, snow melters, fuel dispensers, boilers, emergency electrical generators, and fuel storage tanks.

Assessment Methodology

For the *2018/2019 EDR*, EPA criteria air pollutants (and their precursors) including CO, NO_X, $PM_{10}/PM_{2.5}$, and VOCs were analyzed for aircraft-related sources (i.e., aircraft engines), GSE (including APUs), motor vehicles, and an "other" category that includes a variety of stationary sources and fuel storage and handling facilities. Emissions of criteria air pollutants/pollutant precursors were estimated based on input data such as activity levels or material throughput rates (e.g., fuel usage, VMT, electrical consumption, etc.) that are applied to appropriate emission factors (for example, in units of grams per VMT).

Estimates of PM emissions associated with Logan Airport activities were first reported in the *2005 EDR* in response to the then recent availability of a Federal Aviation Administration (FAA)-updated method (First Order Approximation [FOA]) for computing aircraft $PM_{10}/PM_{2.5}$ emission factors. $PM_{10}/PM_{2.5}$ emissions are now routinely reported in the EDRs and ESPRs, including this *2018/2019 EDR*.

Additionally, the analyses address the primary GHGs associated with airport operations. This includes carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). The results of the *2018/2019 EDR* are reported in units of metric tons (MT) of CO_2 equivalents (CO_2eq) based on the appropriate Global Warming Potentials (GWPs). GHG emissions are calculated in much the same way as criteria air pollutants/pollutant precursors. This includes the use of input data such as activity levels or material throughput rates (e.g., fuel usage, VMT, electrical consumption, etc.) that are applied to appropriate emission factors (for example, in units of GHG emissions per gallon of fuel). Again, these input data were either based on Massport records or data derived from the models. GWPs and emission factors were obtained from the Intergovernmental Panel on Climate Change (IPCC) and the EPA, respectively.

Consistent with prior EDR and ESPR years, the 2018 and 2019 GHG assessments include aircraft operations within the taxi-idle/delay mode and up to 3,000 feet, which encompasses the landing and takeoff (LTO) cycle. GHG emissions associated with GSE, motor vehicles, a variety of stationary sources, and electricity usage were also included following the guidance issued by the Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP) *Report 11, Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories*.[10]

10 TRB, ACRP Report 11, Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories, http://www.trb.org/Publications/Blurbs/160829.aspx.

Massport has direct ownership or control over a small percentage of Logan Airport-related GHG emissions (11.0 percent in 2018 and 11.1 percent in 2019) and their sources (mostly limited to Massport fleet vehicles, stationary sources, and electrical consumption within Massport buildings). As with most commercial service airports, the vast majority of the GHG emission sources are owned, controlled, or generated by the airlines, other airport tenants, and the general public (motor vehicles).

Massport has used the FAA's Aviation Environmental Design Tool (AEDT)[11] for air quality modeling of aircraft-related emissions, which has replaced the legacy Emissions and Dispersion Modeling System (EDMS) tool. The AEDT model was used for the first time for modeling reported in the *2016 EDR*. Additionally, motor vehicle emission factors were obtained from EPA's latest approved version of MOtor Vehicle Emission Simulator (MOVES, Version 2014b). The following describes in more detail the air quality models (i.e., AEDT and MOVES) used in the analyses.

FAA Aviation Environmental Design Tool (AEDT)

The AEDT model was released in 2015 and is FAA's approved computer model for calculating emissions from aircraft-related sources. As discussed in *Chapter 6, Noise Abatement*, AEDT is also designed to assess airport noise. The AEDT model was developed to incorporate the most up-to-date and best-available science. The latest version of AEDT is 3c (AEDT 3c), which was originally released on March 6, 2020. However, during initial planning for the next version of AEDT, a database discrepancy and related aircraft performance calculation issue was discovered that, in specific circumstances, may affect noise and emissions outcomes, therefore an AEDT 3c Re-release version was made available on June 19, 2020. AEDT 3c Re-release supersedes the previous model version (i.e., AEDT 2d version) used in the 2017 air quality analysis. From an air quality perspective, the primary differences between the two model versions are the databases associated with emission factors and aircraft/engine combinations.

As a result of the variances in engine emission factors and available aircraft/engine combinations, the AEDT 3c model results with the 2018 aircraft fleet show higher aircraft emissions of VOC, CO, and $PM_{10}/PM_{2.5}$, but a slight decrease in NO_X when compared to AEDT 2d. These differences in emissions are presented in **Table 7-4**. For comparison purposes, the 2017 AEDT 2d and 2019 AEDT 3c aircraft emissions are also shown.

As an example of these differences, there was a 30.2 percent increase in $PM_{10}/PM_{2.5}$ aircraft emissions in 2018 between AEDT 3c and AEDT 2d that is attributable to a change in methodology used to estimate PM emissions in the AEDT model (i.e., FOA 4.0 versus FOA 3.0). Similarly, there is a 32.4 percent increase in $PM_{10}/PM_{2.5}$ aircraft emissions in 2018 when applying AEDT 3c compared to 2017 when applying AEDT 2d. This is also attributable to the aforementioned modeling methodology change in addition to differences in fleet mix and operations between the two years.

Since its release, FAA continues to enhance the AEDT model by expanding its capabilities, correcting computational errors, and making it more user-friendly. These improvements are reflected in periodic version releases of the model, which are expected to continue for the foreseeable future.

11 FAA, Aviation Environmental Design Tool (AEDT) Version 3c, https://aedt.faa.gov/3c_information.aspx.

Table 7-4 AEDT 2d and AEDT 3c Aircraft Emissions Inventory Comparison

	Pollutant (kg/day)			
Model	**VOC**	**NO_X**	**CO**	**$PM_{10}/PM_{2.5}$**
2017 AEDT 2d	778	5,577	5,926	43
2018 AEDT 2d	745	5,892	6,113	43
2018 AEDT 3c	759	5,849	6,978	56
2019 AEDT 3c	771	6,123	7,171	58
% Difference between 2018 AEDT 3c versus 2018 AEDT 2d:	**1.9%**	**(0.7%)**	**14.2%**	**30.2%**
% Difference between 2018 AEDT 2d versus 2017 AEDT 2d:	**(4.3%)**	**5.6%**	**3.2%**	**1.7%**
% Difference between 2018 AEDT 3c versus 2017 AEDT 2d:	**(2.5%)**	**4.9%**	**17.8%**	**32.4%**
% Difference between 2019 AEDT 3c versus 2018 AEDT 3c:	**1.6%**	**4.7%**	**2.8%**	**2.9%**

Source: Massport and KBE, 2020.
Notes: Negative numbers are shown in ( ).
Modeled emissions totals are rounded numbers. Percent calculations based on exact numbers.
CO – carbon monoxide; NO_X – oxides of nitrogen; PM – particulate matter; VOC – volatile organic compound.

EPA MOtor Vehicle Emission Simulator (MOVES)

MOVES (Version 2014b) was released in 2018 and is EPA's latest approved computer model for estimating emissions from mobile sources (i.e., on-road motor vehicles and most nonroad equipment) at the national, county, and project level for criteria air pollutants/precursor pollutants, GHGs, and air toxics. Compared to the previous version (i.e., MOVES2014a), MOVES2014b incorporates significant improvements in calculating nonroad equipment emissions but does not significantly change the on-road criteria air pollutant emissions results. Specifically, MOVES2014b improves nonroad engine population growth rates, nonroad Tier 4 engine emission rates, and sulfur levels of nonroad diesel fuels.

Air Quality Emission Sources

For the purpose of the analysis, air emissions associated with Logan Airport operations includes aircraft, GSE (including APUs), motor vehicles, and a source category called "other." These are described below, each of which has its own assessment methodology, database, and assumptions.

The following sources of emissions were analyzed in the *2018/2019 EDR*:

- **Aircraft** – FAA's AEDT is now the EPA-preferred and the FAA-required model for calculating aircraft-related emissions. As previously stated, the most recent version of AEDT is AEDT 3c, which was used in support of the 2018 and 2019 air quality analyses. For consistency with prior EDRs and ESPRs, the findings from the previous model, AEDT2d, were also used for comparison purposes to discern which changes are attributable to the model version differences and which are attributable to variances in operations and other factors.

  Similar to past years, actual 2018 and 2019 aircraft fleet mixes at Logan Airport were used as input to AEDT. In a few instances where the aircraft/engine type combinations operating at Logan Airport were

not available in the AEDT database, substitutions were made based on the closest match of aircraft frame and engine types using professional judgement. **Tables I-4** and **I-5** in Appendix I, *Air Quality/Emissions Reduction,* contains the 2018 and 2019 data, respectively, that were used to program the different model versions, including the aircraft and engine types, and numbers of LTOs. Following previous methodology, the Logan Airport aircraft fleet was grouped into four categories: commercial air carriers, commuter aircraft, general aviation (GA), and cargo aircraft.

According to these data, from 2017 to 2018, total LTOs increased by 5.6 percent, with air carrier LTOs increasing by 4.5 percent, commuter LTOs increasing by 8.4 percent, air cargo LTOs increasing by 5.6 percent, and GA increasing by 8.5 percent.

Additionally, from 2018 to 2019, total LTOs increased by 0.7 percent, with air carrier LTOs increasing by 0.5 percent, commuter LTOs increasing by 3.7 percent, air cargo LTOs increasing by 8.4 percent, and GA decreasing 7.0 percent.

Updated aircraft taxi/delay times are based on data obtained from the FAA Aviation System Performance Metrics (ASPM) database for years 2018 and 2019.[12] According to this database, the average aircraft taxi/delay times at Logan Airport from 2017 to 2018 increased from 26.6 minutes to 27.3 minutes or 2.6 percent. Similarly, average aircraft taxi/delay times from 2018 to 2019 increased from 27.3 minutes to 28.0 minutes or 2.7 percent. The pandemic has resulted in a restructuring of airline fleets and expedited retirement of older, lower, and less fuel-efficient aircraft. Updates will be provided in upcoming EDRs.

- **Ground Service Equipment** – Estimates of GSE emissions (including APUs) were based on AEDT emission factors and continue to reflect emission reductions attributable to Massport's AFV Program and the conversion of Massport and/or tenant GSE and fleet vehicles to CNG or electric. Accordingly, GSE emissions factors decreased from 2017 through 2019. Other AEDT input data are based on the updated Logan Airport-specific GSE time-in-mode (TIM) survey conducted in 2017, combined with the most recent GSE fuel use (i.e., gasoline, diesel, liquid petroleum gas, and electric) data from Massport's Vehicle Aerodrome Permit Application Program for Logan Airport.
- **Motor Vehicles** – Motor vehicle emission factors were obtained from the new, and most recent, version of EPA's MOVES model (i.e., MOVES2014b) combined with MassDEP-recommended motor vehicle fleet mix data, operating conditions, and other Massachusetts-specific input parameters. In general, the emission factors obtained from MOVES2014b decrease as years progress due to improved engine efficiencies. The MOVES input/output files are included in Appendix I, *Air Quality/Emissions Reduction*. In addition, Chapter 5, *Ground Access to and from Logan Airport,* of this *2018/2019 EDR* provides a discussion of the on-Airport VMT data used for this analysis. On-Airport VMT and curbside/parking volumes were predicted by a new spreadsheet-based volumetric model, replacing the previously used VISSIM[13] microsimulation model. The most noteworthy benefit the new model brings is that it is based on actual hourly ground access activity data instead of depending on gross factors. The new model is built around the previous roadway network and link configuration developed for the VISSIM model and was calibrated by running 2017 data and comparing to the 2017 VISSIM model results. (Refer to Chapter 5, *Ground Access to and from Logan Airport,* for more information.)

12 FAA, Aviation System Performance Metrics (ASPM) Database. https://aspm.faa.gov/.
13 PTV America. 2011. Verkehr In Städen Simulationsmodell – VISSIM version 5.40 [computer software].

- **Other Sources** – Emissions associated with fuel storage and handling facilities, the Central Heating and Cooling Plant, snow melters, emergency generators, space heaters, and fire training at Logan Airport were based on annual fuel throughput records for 2018 and 2019, combined with appropriate EPA emission factors (for example, compilation of Air Pollution Emission Factors [AP-42], manufacturer provided emission factors, or emission factors obtained from NO_X RACT compliance testing). Since 2017 natural gas usage at Logan Airport has increased and No. 2 fuel oil usage has decreased. The increase in natural gas usage is primarily due to the shift to high efficiency natural gas boilers. Notably, in November 2014, Massport converted the Central Heating and Cooling Plant fuel oil system from No. 6 to No. 2 fuel oil, still retaining the ability to burn natural gas, which it burns approximately 97 percent of the time. Converting the Central Heating and Cooling Plant fuel oil system allows Massport to reduce energy use and air emissions while maintaining the ability to use backup fuel oil in the event of a disruption of natural gas service. Massport is planning to upgrade the Central Heating and Cooling Plant at Logan Airport to accommodate the anticipated increase in heating load for the Terminal E expansion. The project will include replacing the existing dual fuel Boiler 3 with a new natural gas fired boiler of approximately the same capacity.

In all cases, Massport undertakes a variety of programs to reduce non-Massport Airport-related emissions through its support of HOV initiatives, including: subsidizing free outbound Silver Line Service from Logan Airport; supporting use of alternative fuels by airport taxis; providing an on-Airport CNG station; and providing electric plug-ins for GSE, facilitating the replacement of gas- and diesel-powered GSE with eGSE, 400-Hz power, and PCA at all airplane contact gates. Massport is advancing plans to extend the infrastructure for plug-in GSE in various locations.

Emissions Inventory in 2018 and 2019

This section provides the results of the 2018 and 2019 Logan Airport emissions inventories for the pollutants VOC, NO_X, CO, and $PM_{10}/PM_{2.5}$ using the AEDT 3c and MOVES2014b models, and standard emission factors for stationary sources. O_3 is a secondary pollutant formed by the interactions of NO_X and VOCs throughout the region and is therefore not presented in the analysis. Emissions of SO_2 and Pb are not computed, as Logan Airport emission sources are very small generators of these two EPA criteria air pollutants.

As stated above, the aircraft emissions inventory was computed based on the actual number of aircraft operations, fleet mix, and operational times-in-mode at the Airport in 2018 and 2019. Similarly, emissions associated with GSE (including APUs), motor vehicles, fuel storage and handling facilities, and a variety of stationary sources (such as steam boilers, snow melters, live-fire training, space heaters, and emergency generators) associated with Logan Airport were also computed based on actual conditions.

As in previous EDRs and ESPRs, the 2018 and 2019 emissions inventories for Logan Airport are used for short-term comparisons to the 2017 and 2018 inventories results, respectively, as well as for long-term comparisons to previous EDRs and ESPRs extending back to 1990.

For ease of review, the tables and figures containing the 2018 and 2019 results also show the results for 1990 and 2000 and then annually for 2010 to 2017. In this way, the changes in Logan Airport air quality conditions can be evaluated in both the short- and long-term timeframes and on a common basis.

The changes in emissions year-to-year is a function of several variables. These include growth in operations and changes in the aircraft fleet, advancements in aircraft engine technologies, improved airfield efficiencies, and Massport's emission reduction measures such as the GSE replacement initiatives. Another important factor involves the continuous evolution of air quality models. An example of the effects of model versions on analysis results is discussed below.

As shown in **Table 7-5**, the 2018 emissions inventory using AEDT 3c/MOVES2014b results in lower emissions of VOCs, and higher emissions of CO, $PM_{10}/PM_{2.5}$, and NO_X in comparison to the 2017 inventory using AEDT 2d/MOVES2014b. The differences in results between the 2018 and 2017 inventories are due to the difference in model versions and operational input data between the two analysis years. For example, 2018 aircraft operations and taxi times are up 5.6 percent and 2.6 percent, respectively, when compared to 2017.

Table 7-5 Total Emissions Inventory Comparison, 2017, 2018, and 2019

	Pollutant (kg/day)			
Model	**VOC**	**NO_X**	**CO**	**$PM_{10}/PM_{2.5}$**
2017 AEDT 2d/MOVES2014b	1,273	5,935	7,092	77
2018 AEDT 3c/MOVES2014b	1,270	6,152	8,106	90
2019 AEDT 3c/MOVES2104b	1,295	6,440	8,267	92
% Difference 2017 to 2018	**(0.2%)**	**3.6%**	**14.3%**	**17.3%**
% Difference 2018 to 2019	**2.0%**	**4.7%**	**2.0%**	**2.0%**

Source: Massport and KBE, 2020.
Notes: Negative numbers are shown in ( ).
Modeled emissions totals are rounded numbers. Percent calculations based on exact numbers.
CO – carbon monoxide; NO_X – oxides of nitrogen; PM – particulate matter; VOC – volatile organic compound.

Results for the 2019 emission inventory are also presented and compared to 2018. In 2019 aircraft operations and taxi times slightly increased (i.e., 0.7 percent and 2.7 percent, respectively) when compared to 2018. The increase in emissions of all pollutants between the 2019 and 2018 inventories are attributable to increases in aircraft operations, VMT, and stationary source fuel consumption.

The following sections compare in detail the air emission results by pollutant (i.e., VOC, NO_X, CO, and $PM_{10}/PM_{2.5}$) and by source (i.e., aircraft, GSE/APUs, motor vehicles, stationary sources, and non-mobile sources) between 2018 and 2017 and between 2019 and 2018.

Volatile Organic Compounds (VOCs)

In 2018 and 2019, total VOC emissions at Logan Airport were 511 tons per year (tpy) (or 1,270 kilograms per day [kg/day]) and 521 tpy (or 1,295 kg/day), respectively. The 2018 VOC emissions show a decrease of 0.2 percent from 2017 levels; and the 2019 VOC emissions show an increase of 2.0 percent from 2018 levels.

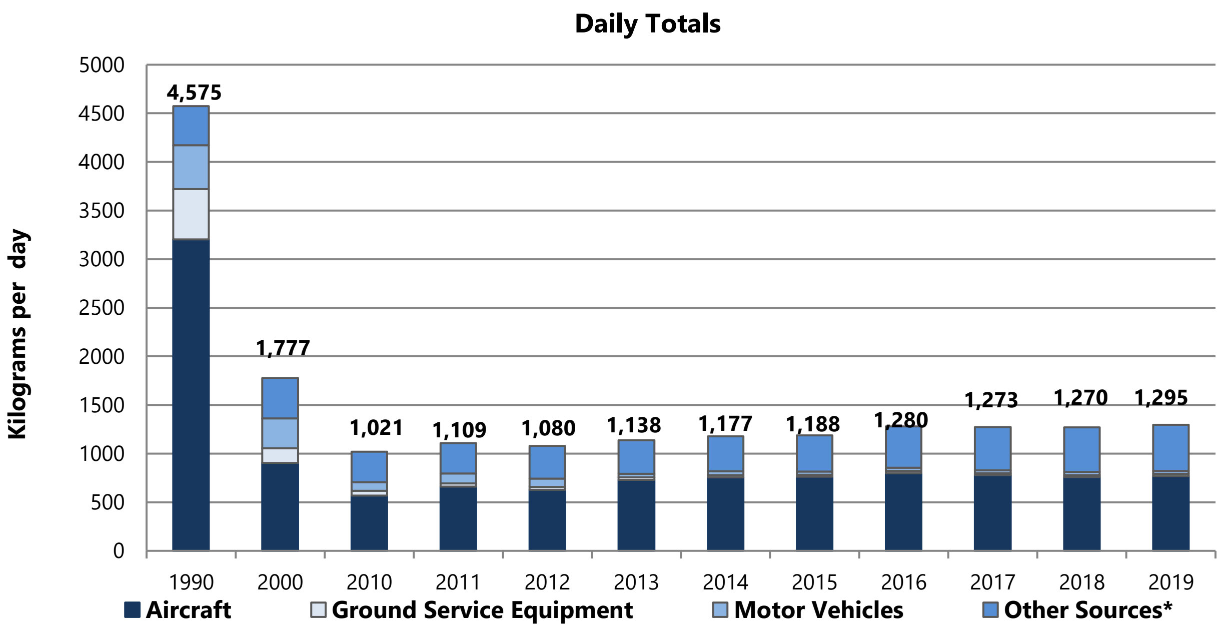
The long-term trend for VOC emissions reveals a substantial decrease in these emissions from 1990 through 2010. From 2010 to 2019 there has generally been an increase in emissions with fluctuations on an annual basis as shown in **Figure 7-2**. Additionally, **Figure 7-3** shows the percent breakdown of these emissions by source category for 2018 and 2019. Similarly, **Table 7-6** shows the computed VOC emissions in kg/day for each emission source from 1990, 2000, and 2010 to 2019. Other key findings from this analysis include the following:

- Total aircraft-related VOC emissions decreased by 2.5 percent in 2018 (AEDT 3c) compared with 2017 (AEDT 2d). The decrease in 2018 compared to 2017 was largely due to differences in fleet mix between 2017 and 2018 as well as model version differences between AEDT 3c and 2d, as previously discussed. When comparing 2019 to 2018 VOC emissions, there is an increase of 1.6 percent, this is primarily due to the increase in aircraft operations in the reporting years.
- GSE-related VOC emissions, including APUs, were 1.5 percent lower in 2018 (AEDT 3c) than in 2017 (AEDT 2d) and 2.7 percent lower in 2019 than in 2018. These differences are largely due to the change in fleet mix between the two analysis years, which subsequently affects the GSE and APU assignments to an aircraft.
- VOC emissions from motor vehicles in 2018 increased 3.1 percent from 2017 levels. Additionally, 2019 levels decreased 4.0 percent from 2018. These changes are due to the offsetting of decreasing motor vehicle emission factors to increases of VMT.
- VOC emissions from stationary and other non-mobile sources (fuel storage/handling, Central Heating and Cooling Plant, snow melter usage, firefighter training, etc.) increased by approximately 3.6 percent from 2017 to 2018 and 3.3 percent from 2018 to 2019. These changes are attributable to the increase in emissions from fuel storage/handling activities.

As shown in **Figure 7-3**, in 2018, aircraft continued to represent the largest source (60 percent) of VOC emissions associated with Logan Airport, followed by other sources (36 percent), motor vehicles and GSE (both 2 percent). Similarly, in 2019 aircraft represent 59 percent of VOC emissions with other sources, GSE and motor vehicles, representing the remaining 37 percent and 2 percent, respectively.

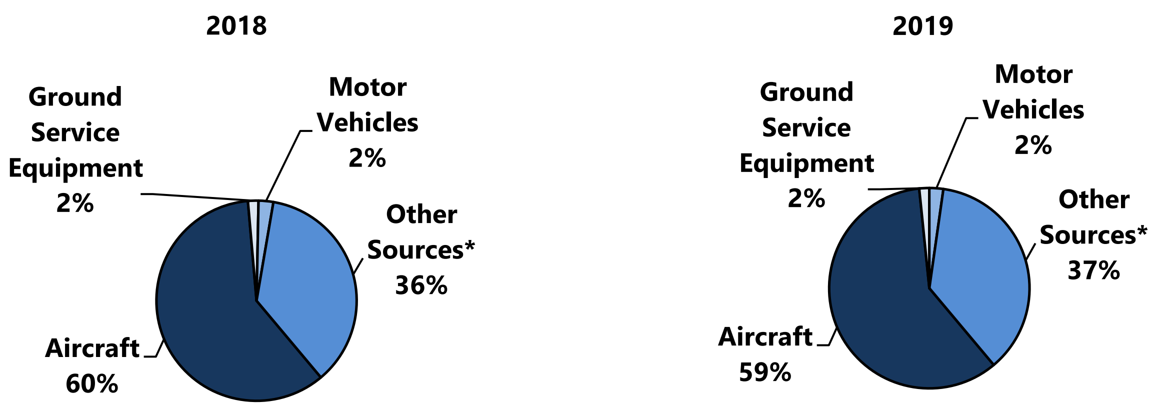
The long-term decline and subsequent leveling-off of VOC emissions associated with Logan Airport is especially significant to ozone in the Boston metropolitan area. VOCs and NO_X are the two main pollutants involved in ozone formation. However, like most urban environments, Boston is characterized as "VOC-Limited" for ozone. This means that reductions in VOCs are more beneficial (i.e., decreases ozone) than increases in NO_X, which are undesirable (i.e., increases ozone). In other words, ozone formation is impacted more by VOCs than by NO_X. Therefore, the approximate 30-year trend in VOC emissions reductions (see **Figure 7-2** and **Table 7-6**) represents a potential counterbalance to the increase in NO_X emissions presented in the following section.

Figure 7-2 Modeled Emissions of VOCs at Logan Airport, 1990, 2000, 2010-2019



Source: Massport and KBE, 2020.
Notes: Other sources include miscellaneous sources (i.e., Central Heating and Cooling Plant, snow melter usage, fire training, etc.) and fueling sources. In 2018 and 2019, aircraft-related emissions were calculated using AEDT 3c and motor vehicles were calculated using MOVES2014b.

Figure 7-3 Sources of VOC Emissions, 2018 and 2019



Source: Massport and KBE, 2020.
Notes: Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.) and fuel storage and handling facilities. In 2018 and 2019, aircraft-related emissions were calculated using AEDT 3c and motor vehicles were calculated using MOVES2014b.

Table 7-6 Estimated VOC Emissions (in kg/day) at Logan Airport, 1990, 2000, and 2010-2019[1]

Aircraft/GSE Model:	**Logan Dispersion Modeling System (LDMS)**	**EDMS v4.03**	**EDMS v5.1.2**	**EDMS v5.1.3**				**EDMS v5.1.4.1**						**AEDT Version 2c SP2**	**AEDT Version 2d**		**AEDT Version 3c**	
Motor Vehicle Model:	**MOBILE 5a**	**MOBILE 6.0**	**MOBILE 6.2.03**					**MOVES 2010b**	**MOVES 2014**		**MOVES 2014a**				**MOVES 2014b**			
Year:	**1990**	**2000**	**2010**		**2011**	**2012**	**2013**		**2014**		**2015**	**2016**		**2017**		**2018**		**2019**
Aircraft Sources																		
Air carriers	2,175	514	292	292	305	378	448	447	480	480	491	504	553	516	517	531	531	561
Commuter aircraft	681	140	129	125	110	91	91	91	85	85	87	79	74	65	77	81	89	84
Cargo aircraft	303	207	70	70	69	63	44	44	48	48	47	56	61	50	50	23	23	21
General aviation	44	42	81	81	176	93	149	149	144	144	135	121	110	183	134	110	116	105
Total aircraft sources	3,203	903	572	568	660	626	732	731	757	757	761	760	798	814	778	745	759	771
Ground Service Equipment[2]	518	153	49	49	33	30	26	26	23	23	21	24	24	22	22	19	21	21
Motor Vehicles																		
Ted Williams Tunnel through-traffic[3]	N/A	12	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Parking/curbside	192	89	20	20	20	18	17	5	3	4	4	3	3	3	3	3	3	3
On-airport vehicles	258	206	68	68	81	70	67	31	16	34	30	28	28	26	26	28	28	26
Total motor vehicle sources	450	307	86	86	101	88	84	36	19	38	34	31	31	29	29	30	30	29

Table 7-6 Estimated VOC Emissions (in kg/day) at Logan Airport, 1990, 2000, and 2010-2019[1] (Continued)

Aircraft/GSE Model:	**Logan Dispersion Modeling System (LDMS)**	**EDMS v4.03**	**EDMS v5.1.2**	**EDMS v5.1.3**				**EDMS v5.1.4.1**					**AEDT Version 2c SP2**		**AEDT Version 2d**		**AEDT Version 3c**	
Motor Vehicle Model:	**MOBILE 5a**	**MOBILE 6.0**	**MOBILE 6.2.03**					**MOVES 2010b**	**MOVES 2014**		**MOVES 2014a**				**MOVES 2014b**			
Year:	**1990**	**2000**	**2010**		**2011**	**2012**	**2013**		**2014**		**2015**	**2016**		**2017**		**2018**		**2019**
Other Sources																		
Fuel storage/handling	400	412	311	311	311	332	340	340	354	354	366	422	422	439	439	455	455	469
Miscellaneous sources[4]	4	2	5	5	4	4	5	5	5	5	6	5	5	5	5	5	5	5
Total other sources	404	414	316	316	315	336	345	345	359	359	372	427	427	444	444	460	460	475
Total Airport Sources	**4,575**	**1,777**	**1,025**	**1,021**	**1,109**	**1,080**	**1,187**	**1,138**	**1,158**	**1,177**	**1,188**	**1,242**	**1,280**	**1,308**	**1,273**	**1,253**	**1,270**	**1,295**

Source: Massport and KBE, 2020.

Notes: Values may reflect rounding.

N/A – not available.

kg/day - kilograms per day. 1 kg/day is equivalent to approximately 0.40234 tons per year (tpy).

1 Years 2010, 2013 and 2016 were computed with previous years' EDMS versions to provide for a common basis of comparison. Years 2013 and 2014 were also computed with the previous years' motor vehicle emission factors models. Year 2017 was computed with previous versions of AEDT and MOVES. Year 2018 was computed with current and previous versions of AEDT and current version of MOVES. Year 2019 was computed with current version of AEDT and MOVES. See Appendix I, *Air Quality/Emissions Reduction,* for 1993 to 2009 emission inventory results.

2 Ground service equipment (GSE) emissions include aircraft auxiliary power units (APUs) as well as vehicles and equipment converted to alternative fuels.

3 Due to the new roadway configuration and opening of the Ted Williams Tunnel there was no Ted Williams Tunnel through-traffic (which is defined as traffic passing through but not destined for the Airport) at Logan Airport beginning in 2003.

4 Includes the Central Heating and Cooling Plant, emergency electricity generation, snow melter usage, and other stationary sources.

Oxides of Nitrogen (NO_X)

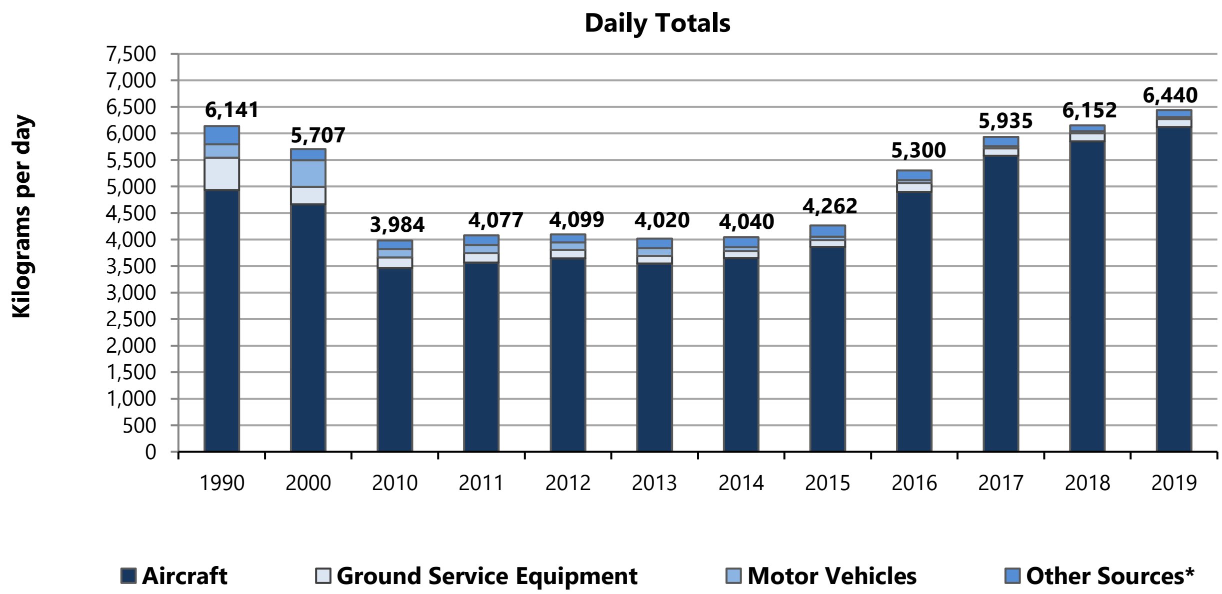
In 2018, total NO_X emissions from all Airport-related sources were estimated to be 2,475 tpy (6,152 kg/day), which represents an increase of 3.6 percent from 2017 levels. In 2019, total NO_X emissions from all Airport-related sources were estimated to be 2,591 tpy (6,440 kg/day), which represents an increase of 4.7 percent from 2018 levels. This change is largely due to differences in aircraft fleet mix and increases in the number of LTOs and taxi times. In 2018 and 2019, aircraft taxi times increased by 2.6 percent and 2.7 percent from 2017 and 2018 levels, respectively. **Figure 7-4** illustrates short- and long-term trends in NO_X emissions and **Table 7-7** shows the NO_X contribution for each emission source in 1990, 2000, and 2010 through 2017. Additionally, **Figure 7-5** shows the percent breakdown of NO_X emissions by source category for 2018 and 2019.

Key findings related to the 2018 and 2019 NO_X emissions inventory results include the following:

- When compared to 2017 (AEDT 2d) values, total aircraft-related NO_X emissions were 4.9 percent higher in 2018 (AEDT 3c). By comparison, 2019 NO_X emissions are 4.7 percent higher than 2018 levels. The increase from 2017 to 2018 was largely due to differences in fleet mix, taxi times, and increases in total aircraft operations and partially due to the changes in model versions. The increase from 2018 to 2019 was largely due to differences in fleet mix, taxi times, and increases in total aircraft operations.
- Total GSE-related emissions (including APUs) of NO_X increased by 4.6 percent in 2018 (AEDT 3c) compared to 2017 (AEDT 2d) but decreased by less than 0.7 percent in 2019 compared to 2018. Specifically, the increase from 2017 to 2018 is mainly caused by APU emission factors, which vary significantly (i.e., 19.8 percent) between model versions. Between 2018 and 2019 APU emissions still increase but to a lesser extent (i.e., 6.3 percent). GSE emissions (not including APUs) for both comparison years decrease (i.e., 13.1 percent from 2017 to 2018 and 11.9 percent from 2018 to 2019) due to Massport's AFVs initiatives.
- NO_X emissions from motor vehicles in 2018 increased by 1.3 percent from 2017 levels. This increase was largely attributable to higher VMT counts from on-Airport vehicles, and differences in the MassDEP-recommended motor vehicle fleet mix data, operating conditions, and other Massachusetts specific input parameters. By comparison, computed NO_X emissions from motor vehicles in 2019 decreased by 12.0 percent from 2018 levels; the decrease in motor vehicle emissions is attributable mainly to lower NO_X emission factors.
- Stationary sources showed a decrease in NO_X emissions of 35.7 percent in 2018 compared to 2017. This is primarily attributable to a 14.0 percent decrease in total natural gas fuel usage. Furthermore, NO_X emission factors applied in 2018 were determined based on updated 2018 compliance stack test data, which were approximately 30 percent lower than the 2017 factors based on 2009 stack test data. In 2019, NO_X emissions increased by 17.7 percent from 2018. This is attributable to an increase in use of natural gas at the Airport (i.e., 21.9 percent). Emission factors for 2019 were based on updated 2019 stack test data and were similar to 2018 factors.

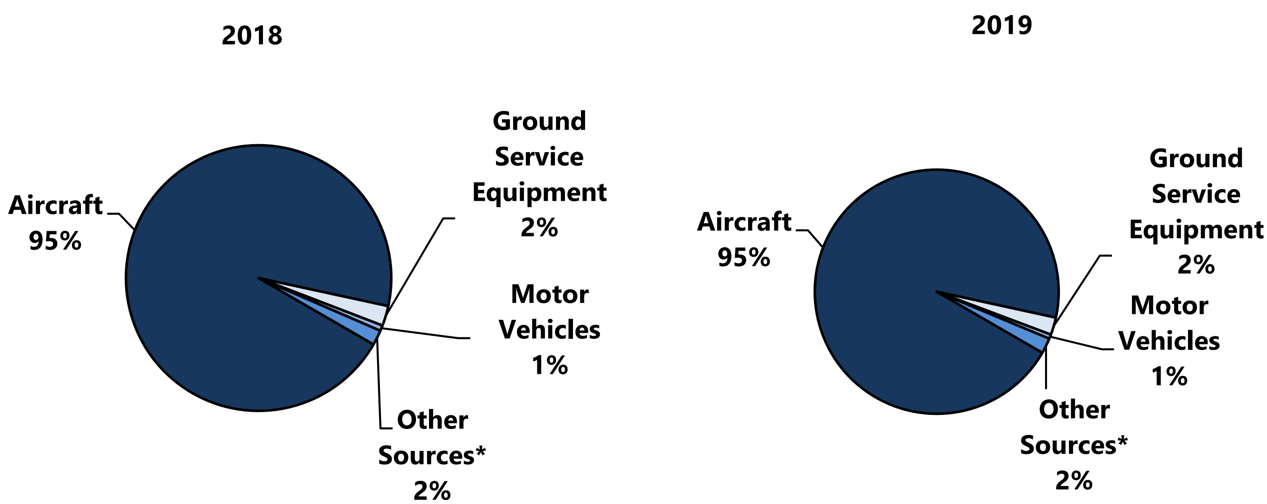
As shown in **Figure 7-5**, aircraft emissions continue to represent in 2018 and 2019 the largest source of NO_X at Logan Airport (95 percent) with the remaining comprising of GSE, other sources and motor vehicles (5 percent). This is an important distinction as Massport does not have any control over these emissions.

Figure 7-4 Modeled Emissions of NO_X at Logan Airport, 1990, 2000, and 2010-2019



Source: Massport and KBE, 2020.
Notes: Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, firefighter training, etc.). In 2018 and 2019, aircraft-related emissions were calculated using AEDT 3c and motor vehicles were calculated using MOVES2014b.

Figure 7-5 Sources of NO_X Emissions, 2018 and 2019



Source: Massport and KBE, 2020.
Notes: Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.). In 2018 and 2019, aircraft-related emissions were calculated using AEDT 3c and motor vehicles were calculated using MOVES2014b.

As discussed above, NO_X is one of the two principal precursors to ozone formation (the other being VOCs); however, there are no NAAQS standards for NO_X or VOCs individually. Total Logan Airport associated NO_X emissions are approximately 2 percent of statewide emissions. The Boston Metropolitan Area is presently designated as Attainment for ozone, meaning that the area complies with the NAAQS for this pollutant. Together with VOCs, emissions of NO_X associated with industry, transportation, agriculture, and other land uses contribute to ozone levels throughout the Northeast. As regional pollutants, the interrelationship between NO_X and VOC emissions are important, as described in the bullets that follow.

- The movement of emissions in the atmosphere regionally (i.e., transport of NO_X and VOCs from outside the region) is significant and contributes substantially to ozone levels in the Boston metropolitan area.
- Boston is generally characterized as "VOC-Limited" for ozone. This means that reductions in VOCs are more beneficial than increases in NO_X are detrimental.
- As reported, Logan Airport-related emission estimates of VOCs are decreasing while NO_X emissions are increasing. When it comes to ozone-formation, the relationship between NO_X and VOCs is not always one-to-one. In the Boston metropolitan area specifically, where VOCs are the most important in ozone formation, the reductions in VOCs at Logan Airport help to moderate the effects of NO_X.

The changes in modeled NO_X emissions at Logan Airport from 1990 through 2019 presented in **Table 7-7** are a result of a combination of the following:

- **Calculation methodology**. For example, the 1990 inventory was prepared using the Logan Dispersion Modeling System (LDMS), the 2000 through 2015 inventories were prepared using EDMS (the version of which varied by year), and the 2016, 2017 and 2018/2019 inventories used AEDT (three different versions). As stated in the *2016 EDR,* there are important differences in EDMS and AEDT that resulted in differences when comparing the results between the two models. The primary differences are described in the *2016 EDR* as being differences in the input data, variances in the aircraft operational characteristics, and differences in the aircraft times-in-mode (in particular those for aircraft climb out during which emissions of NO_X are greatest), emission factors, and a more robust airframe/engine database in AEDT. Additionally, there continue to be updates and variances between versions of AEDT.
- **Number of Aircraft Operations**. In 1990, there were 424,568 operations. By 2010, the level of operations had dropped to 352,643, and by 2019, the level increased to 427,176, surpassing 1990 operations.
- **Fleet Mix**. Changes in the fleet mix (i.e., greater use of quieter but higher NO_X emitting aircraft) are likely to continue in the future. The majority of NO_X emissions from aircraft originate from high-temperature, high-pressure reactions of atmospheric nitrogen in aircraft engines. Over time, aircraft engine technology has evolved to be more fuel-efficient, less polluting, and quieter, in large part, due to improved fuel combustion under these higher temperature and pressure conditions. This interdependency (or trade-off) between increased NO_X, less noise, better fuel efficiency, and generally lower emission factors for other pollutants, is an inevitable outcome of the modernization of the commercial air carrier fleet. Aircraft engine manufacturers are continually advancing combustion technology that is designed to mitigate and reverse the tradeoffs between lower emissions, less noise, and increased NO_X. Further details on the effect of aircraft engine technology on NO_X is presented in the following section.

Table 7-7 Estimated NO_X Emissions (in kg/day) at Logan Airport, 1990, 2000, and 2010-2019[1]

Aircraft/GSE Model:	**Logan Dispersion Modeling System (LDMS)**	**EDMS v4.03**	**EDMS v5.1.2**	**EDMS v5.1.3**	**EDMS v5.1.3**	**EDMS v5.1.3**	**EDMS v5.1.3**	**EDMS v5.1.4.1**	**EDMS v5.1.4.1**	**EDMS v5.1.4.1**	**EDMS v5.1.4.1**	**EDMS v5.1.4.1**	**AEDT Version 2c SP2**	**AEDT Version 2c SP2**	**AEDT Version 2d**	**AEDT Version 2d**	**AEDT Version 3c**	**AEDT Version 3c**
Motor Vehicle Model:	**MOBILE 5a**	**MOBILE 6.0**		**MOBILE 6.2.03**	**MOBILE 6.2.03**	**MOBILE 6.2.03**	**MOBILE 6.2.03**	**MOVES 2010b**	**MOVES 2010b**	**MOVES 2014**	**MOVES 2014a**	**MOVES 2014a**	**MOVES 2014a**	**MOVES 2014a**	**MOVES 2014b**	**MOVES 2014b**	**MOVES 2014b**	**MOVES 2014b**
Year:	**1990**	**2000**	**2010**	**2010**	**2011**	**2012**	**2013**	**2013**	**2014**	**2014**	**2015**	**2016**	**2016**	**2017**	**2017**	**2018**	**2018**	**2019**
Aircraft Sources																		
Air carriers	4,554	4,202	3,031	3,037	3,128	3,154	3,090	3,158	3,245	3,245	3,470	3,912	4,476	5,098	5,100	5,336	5,292	5,522
Commuter aircraft	133	125	203	204	199	182	168	152	155	155	139	97	126	185	196	251	246	267
Cargo aircraft	237	284	197	197	196	192	188	188	203	203	201	224	228	224	224	236	239	252
General aviation	13	49	29	26	43	115	46	48	48	48	53	60	67	41	57	69	72	82
Total aircraft sources	4,937	4,660	3,460	3,464	3,566	3,644	3,492	3,546	3,651	3,651	3,862	4,293	4,897	5,548	5,577	5,892	5,849	6,123
Ground service equipment[2]	603	333	198	198	173	164	145	145	134	134	128	167	167	143	143	127	149	148
Motor Vehicles																		
Ted Williams Tunnel through-traffic[3]	N/A	26	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Parking/curbside	25	52	12	12	11	10	9	16	11	6	7	6	6	4	4	4	4	3
On-airport vehicles	232	425	144	144	148	128	117	131	90	62	59	51	51	37	37	38	38	34
Total motor vehicle sources	257	503	156	156	159	137	126	147	101	68	66	57	57	41	41	42	42	37

Table 7-7 Estimated NO_X Emissions (in kg/day) at Logan Airport, 1990, 2000, and 2010-2019[1] (Continued)

Aircraft/GSE Model:	**Logan Dispersion Modeling System (LDMS)**	**EDMS v4.03**	**EDMS v5.1.2**	**EDMS v5.1.3**				**EDMS v5.1.4.1**					**AEDT Version 2c SP2**		**AEDT Version 2d**		**AEDT Version 3c**	
Motor Vehicle Model:	**MOBILE 5a**	**MOBILE 6.0**	**MOBILE 6.2.03**					**MOVES 2010b**		**MOVES 2014**	**MOVES 2014a**				**MOVES 2014b**			
Year:	**1990**	**2000**	**2010**		**2011**	**2012**	**2013**		**2014**		**2015**	**2016**		**2017**		**2018**		**2019**
Other Sources																		
Fuel storage/handling[4]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous sources[5]	344	211	166	166	179	154	182	182	187	187	206	179	179	174	174	113	113	132
Total other sources	344	211	166	166	179	154	182	182	187	187	206	179	179	174	174	112	112	132
Total Airport Sources	**6,141**	**5,707**	**3,980**	**3,984**	**4,077**	**4,099**	**3,945**	**4,020**	**4,073**	**4,040**	**4,262**	**4,696**	**5,300**	**5,906**	**5,935**	**6,173**	**6,152**	**6,440**

Source: Massport and KBE, 2020.

Notes: Values may reflect rounding.

N/A – not available.

kg/day - kilograms per day. 1 kg/day is approximately equivalent to 0.40234 tons per year (tpy).

1 Years 2010, 2013, and 2016 were computed with previous years' EDMS versions to provide for a common basis of comparison. Years 2013 and 2014 were also computed with the previous years' motor vehicle emission factors models. Year 2017 was computed with previous versions of AEDT and MOVES. Year 2018 was computed with current and previous versions of AEDT and current version of MOVES. Year 2019 was computed with current version of AEDT and MOVES. Appendix I, *Air Quality/Emissions Reduction*, for 1993 to 2009 emission inventory results.

2 Ground service equipment (GSE) emissions include auxiliary power units (APUs) as well as vehicles and equipment converted to alternative fuels.

3 Due to the new roadway configuration and opening of the Ted Williams Tunnel there was no Ted Williams Tunnel through-traffic at Logan Airport beginning in 2003.

4 Fuel storage/handling facilities are not a source of NO_X emissions.

5 Includes the Central Heating and Cooling Plant, emergency electricity generation, snow melter usage, and other stationary sources.

Effect of Aircraft Engine Technology on NO_X

As shown in **Table 7-8**, when representative aircraft are compared, as aircraft engines become quieter (improving from Stage 3 to Stage 5), and more efficient, NO_X emissions increase. For comparison, emissions of VOC and CO decrease and PM emissions fluctuate between noise stage equivalents.

As a means of reducing amounts and costs of fuel use, aircraft engine designers and manufacturers are producing more "fuel-efficient" (i.e., less fuel-burning) engines. This is achieved by enhancing engine performance with improved fuel combustion technologies, greater thrust-generating power, and less engine wear. Aircraft are also being designed to decrease fuel-burn with advancements in aircraft wing and body aerodynamics, light-weight alloy materials and improved means of navigation. These emerging technologies and reduced fuel burn are expected to reduce emissions, reduce noise, and moderate the growth in NO_X emissions into the future.

Table 7-8 Example Stage 3, Stage 4, and Stage 5 Aircraft Types Operating at Logan Airport

			Air Quality (kg/LTO)			
Name	**Model**	**Noise Stage Equivalent**	**VOC**	**NO_X**	**CO**	**PM**
727-200	JT8D-17R	3	1.5	11.5	8.3	0.36
737-800	CFM56-7B27	4	1.2	12.0	7.4	0.07
787-8 Dreamliner	Trent 1000-CE3	5	0.6	41.4	5.7	0.16

Source: Information presented is based on results from AEDT 3c.
Notes: kg – kilograms; LTO – landings and takeoffs.

Carbon Monoxide (CO)

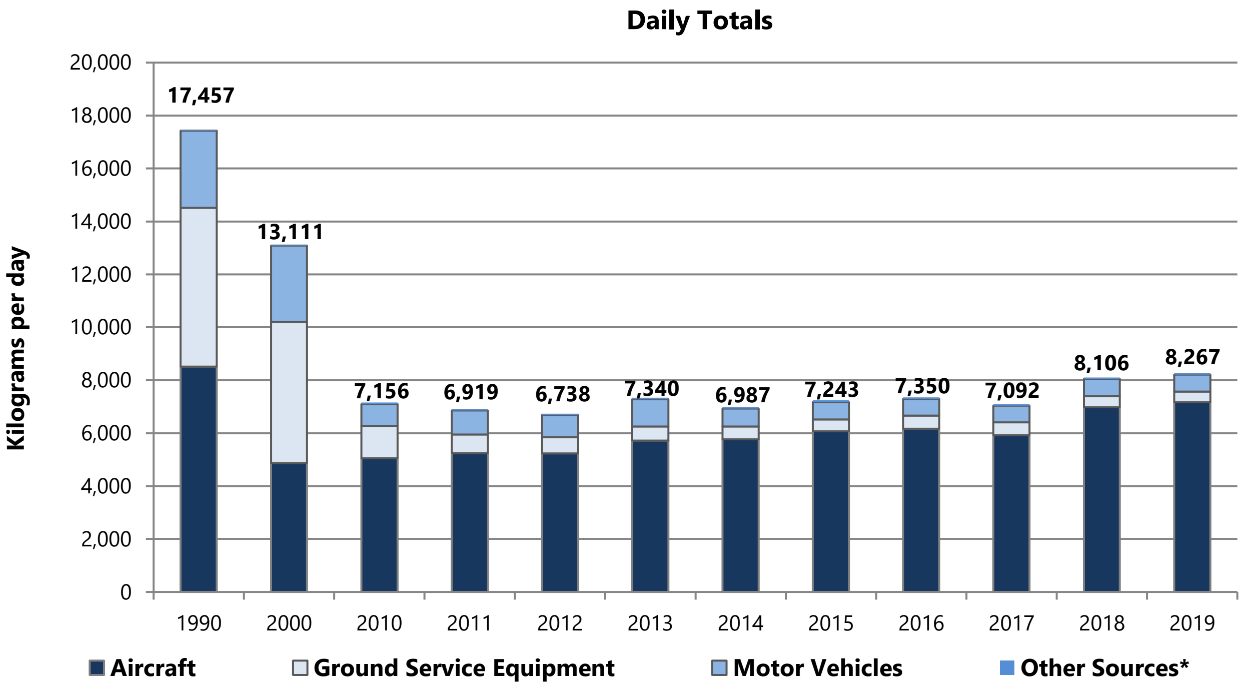
Total CO emissions at Logan Airport in 2018 were 3,261 tpy (8,106 kg/day), about 14.3 percent lower than 2017 levels. By comparison total CO emissions at the Airport in 2019 were 3,326 tpy (8,267 kg/day), or 2.0 percent higher than 2018 levels. **Figure 7-6** shows the continued long-term downward trend (about 53 percent overall reduction from 1990 levels to 2019) in CO emissions associated with Airport activities. **Table 7-9** also shows the breakdown of these emissions, by source category, for the years 1990, 2000, and 2010 to 2019. Other notable findings of the CO emissions inventory include:

- Aircraft-related CO emissions increased 17.8 percent compared to 2017 levels, due to the differences between AEDT 3c and 2d (see **Table 7-4**) in addition to an increase in operations. In comparison, aircraft-related CO emissions increased in 2019 by about 2.8 percent compared to 2018 due to the corresponding increase in aircraft LTOs and taxi time during that year.
- GSE-related (including APUs) CO emissions decreased by 11.4 percent in 2018 compared to 2017, due mostly to the change in fleet mix and overall decrease in GSE run-time as a result. Moreover, GSE emissions of CO decreased by 7.0 percent in 2019 compared to 2018, again due mostly to the changes in aircraft fleet mix which has an effect on the GSE fleet characteristics and usage.
- CO emissions from motor vehicles increased in 2018 by 4.0 percent from 2017 levels. This increase was largely attributable to higher VMT counts from on-Airport vehicles and differences in the MassDEP-recommended motor vehicle fleet mix data, operating conditions, and other Massachusetts specific input parameters. By comparison, computed CO emissions from motor vehicles in 2019 decreased by 1.8 percent from 2018 levels. The decrease in motor vehicle emissions is attributable mainly to lower CO emission factors.
- Stationary sources showed a decrease of 14.0 percent in CO emissions in 2018 compared to 2017. This is primarily attributable to a decrease in boiler and emergency generator usage by the Airport in 2018. In comparison, there is an increase of 19.4 percent from 2019 compared to 2018. This increase is instead attributable to an increase in boiler and emergency generator usage by the Airport in 2019.

Again, as with total emissions of VOCs and NO_X, the overall, long-term trend over the past two decades reveals a substantial decrease in total CO emissions associated with Airport activities.

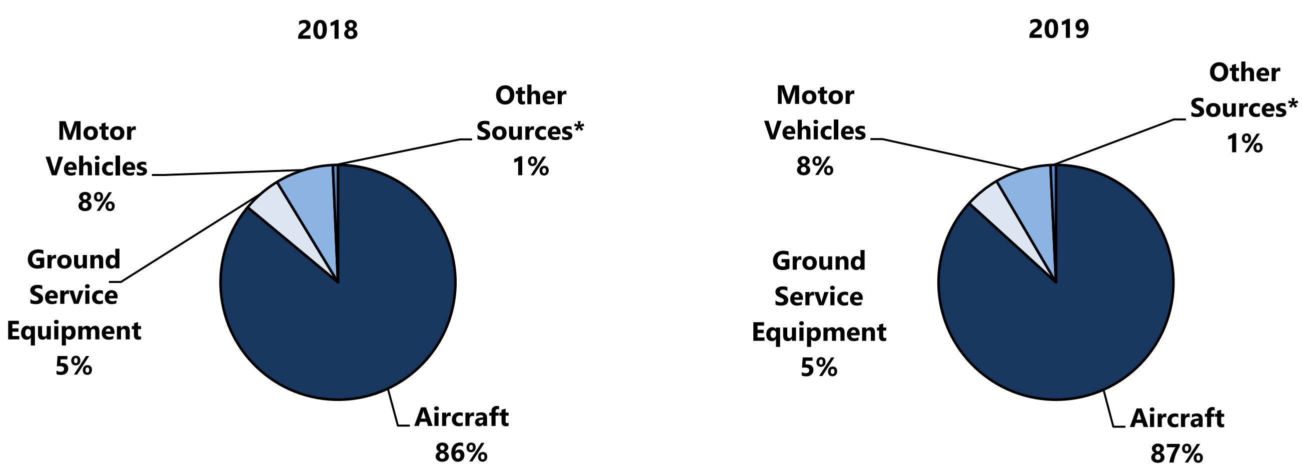
As shown in **Figure 7-7**, in 2018 and 2019, aircraft emissions continued to represent the largest source (approximately 86 percent) of CO at Logan Airport, followed by motor vehicles (8 percent), GSE (5 percent), and other sources (less than 1 percent).

Figure 7-6 Modeled Emissions of CO at Logan Airport, 1990, 2000, and 2010-2019



Source: Massport and KBE, 2020.
Notes: Other stationary sources are not visible on the graph as they make up less than 1 percent of the total.
In 2018 and 2019, aircraft-related emissions were calculated using AEDT 3c and motor vehicles were calculated using MOVES2014b.

Figure 7-7 Sources of CO Emissions, 2018 and 2019



Source: Massport and KBE, 2020.
Notes: Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.) and fueling sources.
In 2018 and 2019, aircraft-related emissions were calculated using AEDT 3c and motor vehicles were calculated using MOVES2014b.

Table 7-9 Estimated CO Emissions (in kg/day) at Logan Airport, 1990, 2000, and 2010-2019[1]

Aircraft/GSE Model:	**Logan Dispersion Modeling System (LDMS)**	**EDMS v4.03**	**EDMS v5.1.2**	**EDMS v5.1.3**				**EDMS v5.1.4.1**				**AEDT Version 2c SP2**			**AEDT Version 2d**		**AEDT Version 3c**	
Motor Vehicle Model:	**MOBILE 5a**	**MOBILE 6.0**	**MOBILE 6.2.03**					**MOVES 2010b**		**MOVES 2014**	**MOVES 2014a**				**MOVES 2014b**			
Year:	**1990**	**2000**	**2010**		**2011**	**2012**	**2013**		**2014**		**2015**	**2016**		**2017**		**2018**		**2019**
Aircraft Sources																		
Air carriers	6,613	2,994	2,531	2,531	2,592	2,816	3,320	3,323	3,486	3,486	3,729	3,879	3,653	3,736	3,740	3,955	3,976	4,182
Commuter aircraft	977	1,188	2,629	2,086	2,042	1,928	1,978	1,907	1,795	1,795	1,826	1,737	1,998	1,905	1,525	1,661	2,483	2,477
Cargo aircraft	576	400	248	259	246	183	155	155	164	164	167	192	201	192	192	143	145	150
General aviation	352	295	177	173	370	304	345	334	319	319	353	336	314	526	470	353	374	363
Total aircraft sources	8,518	4,877	5,585	5,049	5,250	5,232	5,798	5,719	5,764	5,764	6,075	6,144	6,166	6,359	5,926	6,113	6,978	7,171
Ground service equipment[2]	6,001	5,335	1,222	1,222	694	618	533	533	484	484	442	493	493	482	483	392	428	397
Motor Vehicles																		
Ted Williams Tunnel through-traffic[3]	N/A	133	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Parking/curbside	1,218	495	106	106	110	104	104	94	57	51	28	37	37	32	32	28	28	28
On-airport vehicles	1,689	2,245	726	726	806	737	742	935	591	630	630	596	596	592	592	620	620	609
Total motor vehicle sources	2,907	2,873	832	832	916	840	846	1,029	648	681	658	633	633	623	623	648	648	636

Table 7-9 Estimated CO Emissions (in kg/day) at Logan Airport, 1990, 2000, and 2010-2019[1] (Continued)

Aircraft/GSE Model:	**Logan Dispersion Modeling System (LDMS)**	**EDMS v4.03**	**EDMS v5.1.2**	**EDMS v5.1.3**				**EDMS v5.1.4.1**				**AEDT Version 2c SP2**			**AEDT Version 2d**		**AEDT Version 3c**	
Motor Vehicle Model:	**MOBILE 5a**	**MOBILE 6.0**	**MOBILE 6.2.03**					**MOVES 2010b**		**MOVES 2014**	**MOVES 2014a**				**MOVES 2014b**			
Year:	**1990**	**2000**	**2010**		**2011**	**2012**	**2013**		**2014**		**2015**	**2016**		**2017**		**2018**		**2019**
Other Sources																		
Fuel storage/ handling[4]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous sources[5]	31	27	53	53	59	48	59	59	58	58	68	58	58	60	60	52	52	62
Total other sources	31	27	53	53	59	48	59	59	58	58	68	58	58	60	60	52	52	62
Total Airport Sources	**17,457**	**13,112**	**7,962**	**7,156**	**6,919**	**6,738**	**7,236**	**7,340**	**6,954**	**6,987**	**7,243**	**7,328**	**7,350**	**7,524**	**7,092**	**7,205**	**8,106**	**8,267**

Source: Massport and KBE, 2020.

Notes: Values may reflect rounding.

N/A – not available.

1 Years 2010 and 2013 were computed with previous years' EDMS versions to provide for a common basis of comparison. Years 2013 and 2014 were also computed with the previous years' motor vehicle emission factors models. Year 2017 was computed with previous versions of AEDT and MOVES. Year 2018 was computed with current and previous versions of AEDT and current version of MOVES. Year 2019 was computed with current version of AEDT and MOVES. Appendix I, *Air Quality/Emissions Reduction*, for 1993 to 2009 emission inventory results.

2 Ground service equipment (GSE) emissions include aircraft auxiliary power units (APUs) as well as vehicles and equipment converted to alternative fuels.

3 Due to the new roadway configuration and opening of the Ted Williams Tunnel, there was no Ted Williams Tunnel through-traffic at Logan Airport beginning in 2003.

4 Fuel storage/handling facilities are not a source of NO_X emissions.

5 Includes the Central Heating and Cooling Plant, emergency electricity generation, snow melter usage, and other stationary sources.

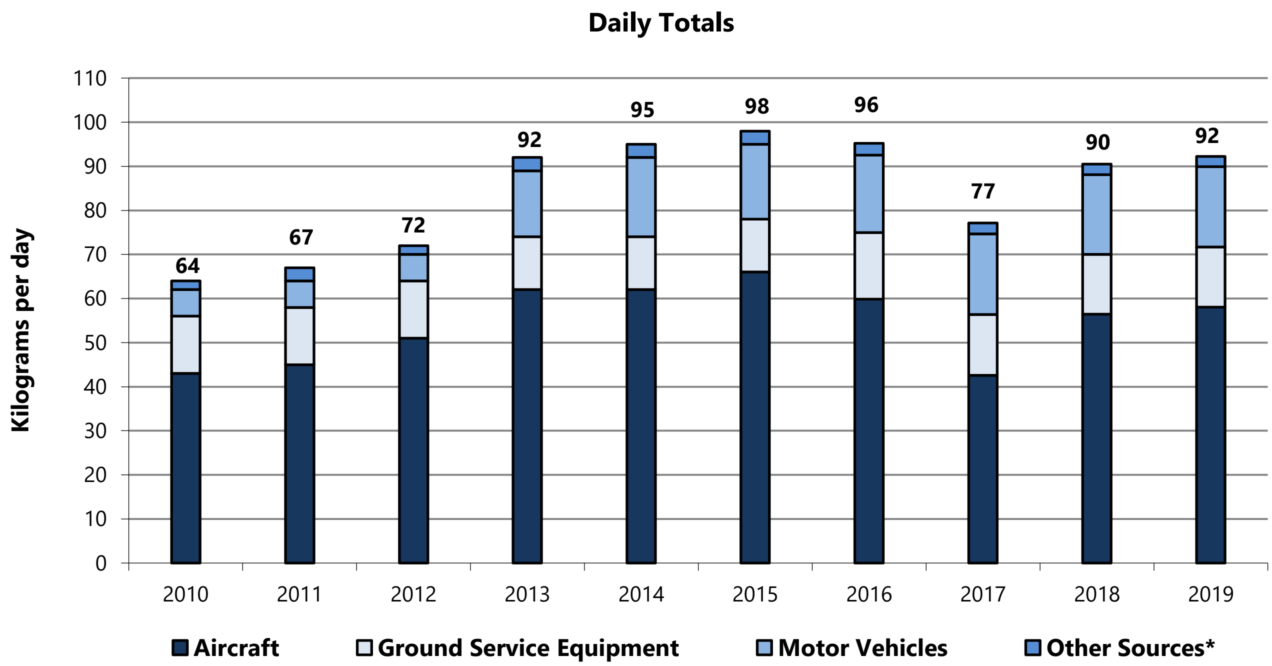
Particulate Matter

Estimated $PM_{10}/PM_{2.5}$ emissions at Logan Airport in 2018 and 2019 are presented in **Table 7-10**. The 2018 results show total emissions of 36 tpy (90 kg/day), or 17.3 percent higher than 2017 levels. The 2019 results show total emissions of 37 tpy (92 kg/day), or 2.0 percent higher than 2018 levels. Explanations of these results and other key findings include the following:

- Estimated aircraft-related $PM_{10}/PM_{2.5}$ emissions increased by 32.4 percent in 2018 (AEDT 3c) compared to 2017 (AEDT 2d) levels. This increase is attributable to the change in methodology used to estimate PM emissions in AEDT (i.e., FOA 4.0 versus FOA 3.0) between AEDT 3c and AEDT 2d. Estimated aircraft-related $PM_{10}/PM_{2.5}$ emissions also increased by 2.9 percent in 2019 compared to 2018 levels, using the same modeling methodology. In this case, the increase is primarily due to increases in operations and differences in fleet mixes.
- $PM_{10}/PM_{2.5}$ associated with GSE-related emissions (including APUs) decreased by 1.4 percent in 2018 (AEDT 3c) when compared to 2017 (AEDT 2d), largely due to the change in fleet mix which decreased aircraft-based GSE/APU operating times. In 2019, emissions increased by 0.1 percent.
- $PM_{10}/PM_{2.5}$ emissions from motor vehicles decreased by 1.2 percent in 2018 when compared to 2017 levels, primarily attributable to a decrease in PM emission factors that were offset by an increase in motor vehicle volumes. In 2019 $PM_{10}/PM_{2.5}$ emissions from motor vehicles increased by 0.8 percent.
- Stationary source emissions of $PM_{10}/PM_{2.5}$ decreased by 4.1 percent in 2018 compared to 2017 due to a decrease in stationary source activity levels. In 2019, emissions increased by 0.2 percent due to a slight increase in stationary source fuel usage by the Airport.

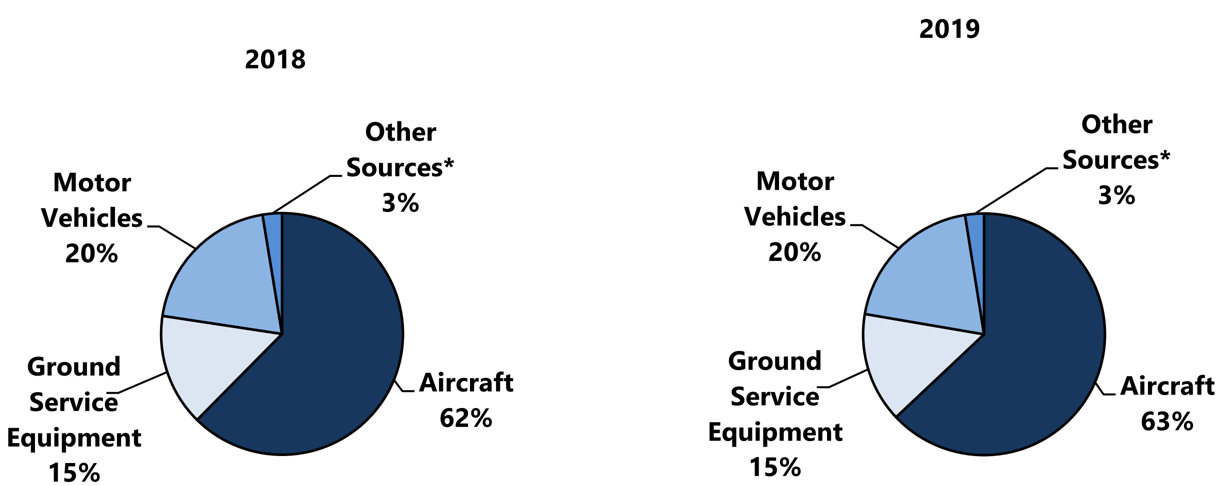
As shown in **Figures 7-8** and **7-9**, in 2018 and 2019 aircraft emissions represent the largest source (approximately 62 percent) of $PM_{10}/PM_{2.5}$ at Logan Airport, followed by motor vehicles (20 percent), GSE (15 percent), and other sources, such as the Central Heating and Cooling Plant, snow melter usage, and fire training (3 percent).

Figure 7-8 Modeled Emissions of $PM_{10}/PM_{2.5}$ at Logan Airport, 2010-2019



Source: Massport and KBE, 2020.
Notes: 2005 (not shown) was the first-year particulate matter (PM) was included in the EDR/ESPR emission inventories.
In 2018 and 2019, aircraft-related emissions were calculated using AEDT 3c and motor vehicles were calculated using MOVES2014b.
Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.).

Figure 7-9 Sources of $PM_{10}/PM_{2.5}$ Emissions, 2018 and 2019



Source: Massport and KBE, 2020.
Note: Other sources include stationary sources (e.g., Central Heating and Cooling Plant, snow melter usage, fire training, etc.).
In 2018 and 2019, aircraft-related emissions were calculated using AEDT 3c and motor vehicles were calculated using MOVES2014b.

Table 7-10 Estimated $PM_{10}/PM_{2.5}$ Emissions (in kg/day) at Logan Airport, 2010-2019[1]

Aircraft/GSE Model:	**EDMS v5.1.2**	**EDMS v5.1.3**				**EDMS v5.1.4.1**					**AEDT Version 2c SP2**		**AEDT 2d**		**AEDT 3c**	
Motor Vehicle Model:	**MOBILE 6.2.03**					**MOVES 2010b**		**MOVES 2014**	**MOVES 2014a**				**MOVES 2014b**			
Year:	**2010**		**2011**	**2012**	**2013**		**2014**		**2015**	**2016**		**2017**		**2018**		**2019**
Aircraft Sources																
Air carriers	34	34	35	43	41	48	48	48	53	57	52	36	36	37	49	51
Commuter aircraft	4	4	3	2	2	7	7	7	7	6	4	2	3	3	4	4
Cargo aircraft	3	3	3	3	2	3	3	3	3	3	2	1	1	1	1	1
General aviation	2	2	4	3	3	4	4	4	4	4	2	3	2	2	2	2
Total aircraft sources	43	43	45	51	48	62	62	62	66	70	60	42	43	43	56	58
Ground service equipment[2]	13	13	13	13	12	12	12	12	12	15	15	14	14	11	14	14
Motor Vehicles																
Parking/curbside	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
On-airport vehicles	6	6	6	6	6	14	14	18	16	17	17	18	18	18	18	18
Total motor vehicle sources	6	6	6	6	6	15	14	18	17	18	18	18	18	18	18	18
Other Sources																
Fuel storage/handling[3]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous sources[4]	2	2	3	2	3	3	3	3	3	3	3	2	2	2	2	2
Total other sources	2	2	3	2	3	3	3	3	3	3	3	2	2	2	2	2
Total Airport Sources	**64**	**64**	**67**	**72**	**69**	**92**	**91**	**95**	**98**	**106**	**96**	**77**	**77**	**74**	**90**	**92**

Source: Massport and KBE, 2020.
Notes: Values may reflect rounding.
kg/day - kilograms per day. 1 kg/day is approximately equivalent to 0.40234 tons per year (tpy); PM - particulate matter.
1 Years 2010 and 2013 were computed with previous years' EDMS versions to provide for a common basis of comparison. Years 2013 and 2014 were also computed with the previous years' motor vehicle emission factors models. Year 2017 was computed with previous versions of AEDT and MOVES. Year 2018 was computed with current and previous versions of AEDT and current version of MOVES. Year 2019 was computed with current version of AEDT and MOVES. Appendix I, Air *Quality/Emissions Reduction*, for 1993 to 2009 emission inventory results.
2 Ground service equipment (GSE) emissions include auxiliary power units (APUs) as well as vehicles and equipment converted to alternative fuels.
3 Fuel storage and handling facilities are not sources of PM emissions.
4 Includes the Central Heating and Cooling Plant, emergency electricity generation, fire training, snow melters, and other stationary sources.

Ultrafine Particles (UFPs)

Within the field of air quality, airborne particles are collectively categorized as PMs and subdivided into size categories based on their diameters. These divisions are total suspended particles (TSP) with diameters ranging from 2.5 to 40 micrometers (μm), course particles (PM_{10}) with diameters ranging from 2.5 to 10 μm, fine particles ($PM_{2.5}$) with diameters less than 2.5 μm, and UFPs with diameters less than 0.1 μm. The majority of these particles originate from the exhaust gases generated by fossil fuel-powered engines and other high-temperature combustion sources including aircraft.

Under the CAA, EPA has established NAAQS for six criteria air pollutants including PM_{10} and $PM_{2.5}$. Outdoor concentrations within EPA standards are considered safe for the public. Presently, UFPs (by themselves) are not regulated ambient air pollutants. UFPs cannot be considered part of $PM_{2.5}$ because $PM_{2.5}$ regulates by a mass per volume concentration, and UFPs have a comparatively negligible mass. Any eventual UFP regulation would likely be regulated by particle count (or particle number concentrations).

EPA has begun to reconsider a NAAQS for UFPs due to their unique physical attributes and potential human health hazards. Under CAA, reassessments of the NAAQS for PM_{10}/$PM_{2.5}$ are underway and should be finalized by 2022.[14] This reassessment would be the next opportunity to consider including UFPs among the criteria air pollutants. However, the link between UFP exposure and adverse health effects, although suggestive, may not rise to the level of promulgating a new NAAQS at this time.

With respect to airport-related UFP studies, the collection of materials is limited. However, recent studies have focused on understanding UFP measurements in the vicinity of airports. Studies conducted at Zurich Airport in Switzerland and London Heathrow Airport in England have demonstrated that UFP dispersion is highly dependent on wind speed and direction at the airport with UFP particle counts being on the order of 10 times higher when measured downwind of the airport.[15,16] A study conducted at Brussels Airport in Belgium demonstrated the UFP emissions from the airport can significantly impact concentrations up to 7 kilometers (4.3 miles) away from the source.[17] These studies have begun to explain the dispersion characteristics of UFPs from airports, but specific health studies to assess impacts of UFPs from airport sources have yet to be conducted.

More recently, two studies were conducted by the University of Southern California and the University of Washington. The study performed by the University of Southern California, demonstrated adverse health effects following exposure to airport-related and roadway traffic-related UFPs near Los Angeles International Airport. A source apportionment analysis was conducted to distinguish aircraft from roadway traffic related UFP sources and demonstrated distinct health impacts associated with each source.[18] The *Mobile ObserVations of*

14 EPA, Final Integrated Review Plan for the Ambient Air Quality Standards for Particulate Matter. 2016. https://www3.epa.gov/ttn/naaqs/standards/pm/data/201612-final-integrated-review-plan.pdf.

15 Fleuti, E., Maraini, S., Bieri, L., 2017. *Ultrafine Particle Measurements at Zurich Airport.* Flughafen Zurich AG.

16 Masiol, M., Harrison, R. M., Vu, T. V., and Beddows, D. C. S. *Sources of Submicrometre Particles Near a Major International Airport,* Atmos. Chem. Phys. Discuss., doi.org/10.5194/acp-2017-150, in review, 2017.

17 Peters, J., Berghmans, P., and Frijns, E. 2016. *Ultrafine Particles and Black Carbon monitoring in the surroundings of Brussels Airport.* Brussels Environmental Agency.

18 Habre, Rima et al. "Short-term effects of airport-associated ultrafine particle exposure on lung function and inflammation in adults with asthma." *Environment international",* vol. 118 (2018): 48-59, doi:10.1016/j.envint.2018.05.031.

Ultrafine Particles (MOV-UP) study led by the University of Washington was conducted to study air quality impacts of air traffic for communities located near and below the flight paths of Seattle-Tacoma International Airport. The findings show key differences exist in the particle size distribution and the black carbon concentration for roadway and aircraft features. These differences are important because they can help distinguish between the spatial impact of roadway traffic and aircraft UFP emissions using a combination of mobile monitoring and standard statistical methods.[19]

Massport is supportive of and is following a research effort undertaken by the FAA Center of Excellence for Alternative Jet Fuels and Environment, Aviation Sustainability Center (ASCENT)[20] attempting to measure UFP emissions related to aircraft and other sources. In July 2017, the research project measured and modeled UFPs for one runway end at Logan Airport. The study is ongoing and will reflect both arrival and departure flight paths. Massport will report on the findings of the study in the next EDR, if available.

Most recently, Massport is cooperating with Boston University, Tufts University, and other researchers in identifying aircraft-specific related UFPs in an urban environment with non-Airport related sources. This research is underway in the East Boston area and Massport continues to contribute by providing Airport operational and other pertinent data.

Greenhouse Gas (GHG) Assessment

GHGs are known to contribute to climate change. In April 2009, the EPA issued a proposed finding that GHGs also contribute to air pollution that may endanger public health or welfare. This action has laid the initial legal groundwork for the regulation of GHG emissions nationwide under the CAA, although currently there are no specific U.S. laws or regulations that call for the regulation of GHGs for airports directly.[21] According to the U.S. General Accountability Office (GAO), aviation accounts "for about 3 percent of total U.S. greenhouse gas emissions from human sources", compared with other industrial sources, including the remainder of the transportation sector (23 percent) and industry (41 percent).[22] Additionally, the EPA's most recent Inventory of U.S. GHG Emissions and Sinks also demonstrates that aircraft emissions represent close to 3 percent of total U.S. emissions.[23]

In May 2010, the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) revised the *Massachusetts Environmental Policy Act (MEPA) Greenhouse Gas Emissions Policy and Protocol*.[24] Under the revised policy, certain projects subject to review under MEPA (though not annual EDR/ESPR filings) are required to:

- Quantify GHG emissions generated by a proposed project; and

19 University of Washington, *Mobile ObserVations of Ultrafine Particles: The MOV-UP study report*, December 2019, https://deohs.washington.edu/sites/default/files/Mov-Up%20Report.pdf.

20 FAA Center of Excellence for Alternative Jet Fuels & Environment. https://ascent.aero/.

21 GHG emission reduction measures have been adopted by the EPA for new aircraft engines, but these regulations do not apply directly to airports.

22 FAA, *Aviation Emissions and Air Quality Handbook (Version 3, Update 1)*, 2015.

23 EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2018, 2020*, https://www.epa.gov/sites/production/files/2020- 04/documents/us-ghg-inventory-2020-main-text.pdf.

24 Massachusetts Executive Office of Energy and Environmental Affairs (EEA). Effective May 5, 2010. Revised Massachusetts Environmental Policy (MEPA) Greenhouse Gas Emissions Policy and Protocol.

- Identify measures to avoid, minimize, or mitigate such emissions.[25]

With respect to the *2018/2019 EDR* GHG emissions inventories,[26] the following information is noteworthy:

- Although the *2018/2019 EDR* is not subject to the MEPA GHG policy (because it does not propose any discrete projects), since the *2007 EDR,* Massport has continued to voluntarily prepare an inventory of GHG emissions both directly and indirectly associated with the Airport.
- The emission source categories in the *2018/2019 EDR* satisfy MEPA's requirement to analyze the environmental impacts of direct and indirect mobile and stationary source emissions.
- Consistent with previous years, the 2018 and 2019 GHG emissions inventories were prepared following methodological guidance by the TRB ACRP. The inventory assigns GHG emissions based on ownership or control (whether they are controlled by Massport, the airlines or other airport tenants, or the general public).
- The 2018 and 2019 GHG emissions inventories include aircraft operations within the ground-based taxi-idle/delay mode and up to the top of the 3,000-foot LTO cycle. For estimating GHGs, the LTO cycle (up to 3,000 feet) uses the default mixing height in AEDT. GHG emissions associated with GSE/APU, motor vehicles, a variety of stationary sources, and electricity usage were also included.
- Massport has direct ownership or control over a small percentage of the GHG emission sources (which include Massport fleet vehicles, stationary sources, and electrical consumption within Massport buildings). The vast majority of the emission sources are owned or controlled by the airlines, other airport tenants (such as rental car companies), and the general public (such as passenger motor vehicles).
- Massport also prepares two other GHG emissions inventories for stationary sources at Logan Airport:
  - A GHG emissions inventory for the MassDEP GHG Emissions Reporting Program for those sources meeting the criteria for Category 1 and Scope 1 (only those sources under the direct ownership and control of Massport);[27,28] and
  - An EPA Greenhouse Gas Summary Report.[29]

The *2018/2019 EDR* analyses followed EEA guidelines and used widely accepted emission factors that are considered appropriate for airports, including IPCC and EPA, as well as being consistent with ACRP guidance.

25 GHGs are comprised primarily of carbon dioxide (CO_2), methane (CH_4), nitrous oxides (N_2O), and three groups of fluorinated gases (i.e., sulfur hexafluoride [SF_6], hydrofluorocarbons [HFCs], and perfluorocarbons [PFCs]). GHG emission sources associated with airports are generally limited to CO_2, CH_4, and N_2O.

26 This EDR greenhouse gas (GHG) inventory is one of three that Massport prepares annually; however, the other two comprise only stationary sources of GHGs and are filed with MassDEP and the EPA respectively. These reports are for Massport-owned-and-operated equipment only, and do not cover any tenant owned/operated-equipment or facilities.

27 Boston Logan International Airport. 2018 and 2019. Massachusetts Department of Environmental Protection (MassDEP) GHG Emissions Reporting Program.

28 Starting with the 2016 reporting year MassDEP combined GHG Reporting with its Source Registration reporting program.

29 EPA Greenhouse Gas Summary Report for Boston Logan International Airport for calendar year 2018 and 2019.

For consistency and comparative purposes, the 2018 and 2019 GHG emissions are segregated by ownership and control into categories. These three categories are further characterized by the degree of control that Massport has over the GHG emission sources as follows:

- **Category 1: Massport Owned** – By definition, these GHG emissions arise from sources that are owned and controlled by the reporting entity (in this case, Massport). More precisely, Category 1 typically represents sources which are owned by the entity, or sources which are not owned by the entity, but over which the entity can exert control. At Logan Airport, these sources include Massport-owned and controlled stationary sources (e.g., boilers, generators, etc.), fleet vehicles, and purchased electricity. On-Airport ground transportation and off-Airport employee vehicle trips are also included as Category 1 emissions as they are partly controlled by the Airport.
- **Category 2: Tenant Owned** – This category comprises sources owned and controlled by airlines and Airport tenants and includes aircraft (on-ground taxi/idle and within the LTO cycle up to 3,000 feet), GSE/APU, electrical consumption, and tenant employee vehicles.
- **Category 3: Public/Private Owned** – This category comprises GHG emissions associated with passenger ground access vehicles. These include private automobiles, taxis, limousines, buses, and shuttle vans operating on the off-Airport roadway network.

Consistent with ACRP guidelines, the operational boundaries of the GHG emissions are also delineated, reflecting the scope of the emission source and include:

- **Scope 1/Direct** – GHG emissions from sources that are owned and controlled by the reporting entity (in this case, Massport) such as stationary sources and Airport-owned fleet motor vehicles.
- **Scope 2/Indirect** – GHG emissions associated with the generation of electricity consumed but generated off-site at public utilities.
- **Scope 3/Indirect and Optional** – GHG emissions that are associated with the activities of the reporting entity (in this case, Massport), but are associated with sources that are owned and controlled by others. These include aircraft-related emissions, emissions from Airport tenant activities, as well as ground transportation to and from the Airport.

The ownership categorization and the emission sources by scope are further detailed in **Table 7-11**. It is also important to note that the GHG emissions inventories computed for this *2018/2019 EDR* are consistent, wherever applicable, with the data provided by Massport for the MassDEP and EPA GHG inventories for Logan Airport for 2018 and 2019. Notably, the *2018/2019 EDR* emissions inventories presented are more comprehensive, as they cover all three scopes of GHG emissions including those from tenants and the public, whereas the MassDEP and EPA GHG Reporting Program covers only stationary sources (Category 1 and Scope 1).

Tables 7-12 and **7-13** present the 2018 and 2019 GHG emissions inventories, respectively. The emissions are reported in CO_2 equivalent values.[30] As shown, in 2018 Massport-controlled emissions represent 11.4 percent, and other tenant-based emissions represent 68.6 percent, purchased electricity (which includes both Massport

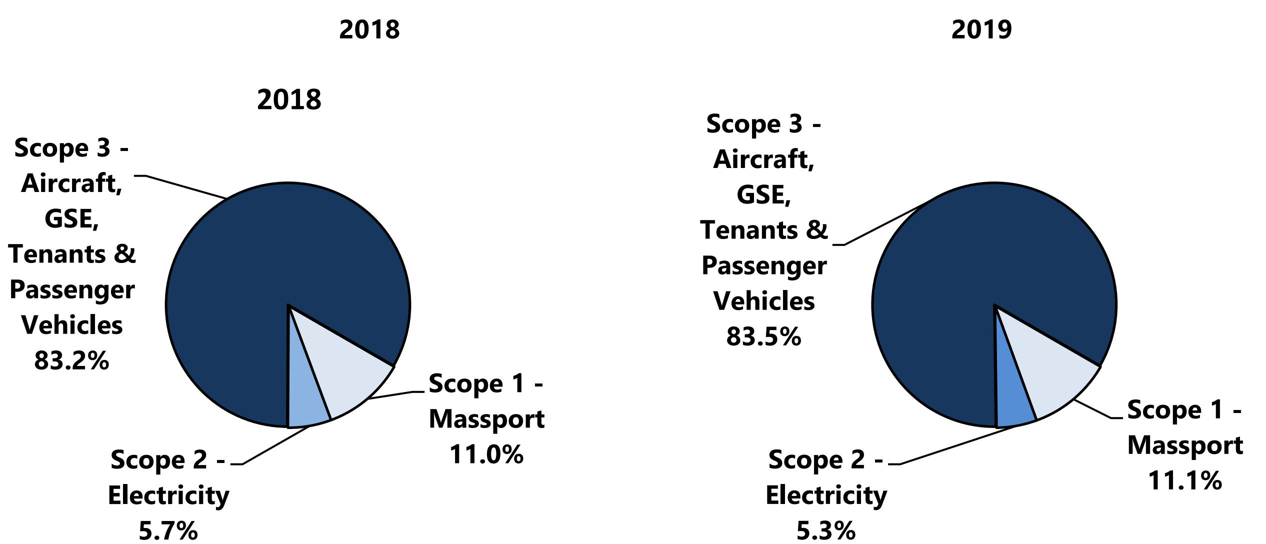
30 CO_2 equivalent values are based upon the Global Warming Potential (GWP) values of 1 for CO_2, 28 for CH_4, and 265 for N_2O (based on a 100-year period) as presented in the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (2014).

and tenant emissions) represents 5.7 percent, and passenger ground access vehicle emissions represent 14.3 percent of total GHG emissions. In 2019 Massport-controlled emissions represent 11.5 percent, and other tenant-based emissions represent 68.7 percent, purchased electricity represents 5.3 percent, and passenger ground access vehicle emissions represent 14.5 percent of total GHG emissions.

Additionally, in 2018 and 2019 Scope 3 still represent the largest source of emissions (i.e., aircraft, GSE/APUs and off-airport roadways), followed by Scope 1 (i.e., on-airport motor vehicles and stationary sources) and Scope 2 (i.e., electricity generation) as shown in **Figure 7-10**.

Overall, total GHG emissions in 2018 increased by about 10 percent from 2017 levels. GHG emissions in 2019 increased by 4 percent from 2018 levels. The increases in emissions from 2017 to 2018, and from 2018 to 2019, are due to the increases in aircraft LTOs and off-Airport VMTs between the comparison years. GHG emissions associated with Logan Airport in 2018 and 2019 are both approximately 1 percent of the most recent statewide emissions estimates, and approximately 12 percent of Boston's citywide emissions.[31] Massport plans to continue updating his GHG Emissions Inventory for Logan Airport annually.

Figure 7-10 Sources of GHG Emissions by Scope, 2018 and 2019



Source: Massport and KBE, 2020.
Notes: Scope 1 emissions are from sources that are owned or controlled by Massport (i.e., ground support vehicles, Massport shuttles, on-airport traffic, and stationary sources), Scope 2 emissions are from electrical consumption (both Massport and tenant), which are generated off-Airport at power generating plants, and Scope 3 emissions are from aircraft, ground service equipment (GSE) including auxiliary power units, and ground transportation to and from the Airport.

31 City of Boston, Boston Community GHG Emissions. 2020. https://www.boston.gov/departments/environment/bostons-carbon-emissions.

Table 7-11 Ownership Categorization and Emission Sources by Scope

Owning/Controlling Entity Categories	Source	Scope
Category 1 - Massport Owned and/or Controlled	Massport Fleet Vehicle	Scope 1
	On-Airport Ground Transportation	Scope 1
	Off-Airport Employee Vehicle Trips	Scope 3
	On-Airport Parking Lots	Scope 1
	Stationary Sources (includes generators, boilers, etc.)	Scope 1
	Fire Training	Scope 1
	Electrical Consumption	Scope 2
Category 2 - Tenant Owned and/or Controlled (includes airlines, government, concessionaires, aircraft operators, fixed-based operators, etc.)	Aircraft (on-ground, within the LTO up to 3,000 feet)[1]	Scope 3
	Auxiliary Power Units	Scope 3
	Ground Service Equipment	Scope 3
	Off-airport Employee Vehicle Trips	Scope 3
	Electrical Consumption	Scope 2
Category 3 - Public Owned and Controlled	Off-Airport Vehicle Trips (includes private automobiles, taxis, limousines, buses, shuttle vans, etc., operating on the off-airport roadway network)	Scope 3

Source: Transportation Research Board, ACRP Report 11, Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories, 2009, http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_011.pdf, and KBE.

Notes: LTO - landing and takeoff cycle.

1 Aircraft cruise mode emissions above the 3,000-foot landing and takeoff cycle (LTO) were not included.

Table 7-12 Estimated Greenhouse Gas Emissions (GHG) Inventory (in MMT of CO_2eq) at Logan Airport, 2018

Source	Category	Scope	CO_2	N_2O	CH_4	Totals
Massport-Controlled Emissions						
Ground Service Equipment[1]	1	1	0.01	<0.01	<0.01	0.01
Massport Shuttle Bus	1	1	<0.01	<0.01	<0.01	<0.01
Massport Express Bus	1	1	<0.01	<0.01	<0.01	<0.01
On-Airport Roadways[2]	1	1	0.04	<0.01	<0.01	0.04
Off-Airport Roadways (Employees)[3]	1	3	<0.01	<0.01	<0.01	<0.01
Parking Lots	1	1	0.01	<0.01	<0.01	0.01
Stationary Sources[4]	1	1	0.03	<0.01	<0.01	0.03
Total Massport Emissions (11.4%)			**0.09**	**<0.01**	**<0.01**	**0.09**
Tenant Emissions						
Aircraft – Ground[5]	2	3	0.22	<0.01	<0.01	0.22
Aircraft – Ground to 3,000 feet[6]	2	3	0.25	<0.01	<0.01	0.26
Aircraft Engine Startup	2	3	<0.01	<0.01	–[10]	<0.01
Ground Service Equipment	2	3	0.02	<0.01	<0.01	0.02
Auxiliary Power Units	2	3	0.01	<0.01	–[10]	0.01
Off-Airport Roadways (Employees)[3]	2	3	0.03	<0.01	<0.01	0.03
Total Tenant Emissions (68.6%)			**0.53**	**<0.01**	**<0.01**	**0.53**
Purchased Electricity Emissions[7]						
Massport	1	2	<0.01	<0.01	<0.01	<0.01
Tenant/Common Area	2 and 3	2	0.04	<0.01	<0.01	0.04
Total Purchased Electricity Emissions (5.7%)			**0.04**	**<0.01**	**<0.01**	**0.04**
Passenger Vehicle Emissions						
Off-Airport Roadways[3]	3	3	0.11	<0.01	<0.01	0.11
Total Passenger Vehicle Emissions (14.3%)			**0.11**	**<0.01**	**<0.01**	**0.11**
Total Logan Airport Emissions (100%)[8]			**0.77**	**<0.01**	**<0.01**	**0.78**
Percent of Statewide Totals[9]			1.0%	<1.0%	<1.0%	1.0%

Source: Massport and KBE, 2020.

Notes: MMT - million metric tons of CO_2 equivalents (1 MMT = 1.1M Short Tons). CO_2 equivalents (CO_2eq) are bases for reporting the three primary GHGs (e.g., CO_2, N_2O, and CH_4) in common units. Quantities are reported as "rounded" and truncated values for ease of addition.

1 Ground service equipment include the Logan Airport fleet.
2 On-airport roadways based on on-site vehicle miles traveled (VMT) and include all vehicles.
3 Off-airport roadways based on off-site Airport-related VMT and average round trip distances.
4 Other sources include Central Heating and Cooling Plant, emergency generators, snow melters, and live fire training facility.
5 Aircraft – Ground emissions include taxi-in, taxi-out and ground-based delay emissions based on AEDT fuel usages.
6 Aircraft – Ground to 3,000 feet include takeoff, climb out, and approach emissions up to a height of 3,000 feet based on AEDT fuel usages.
7 Emissions from electrical consumption occurs off-airport at power generating plants.
8 Total Emissions = Airport + Tenant + Public.
9 Percentage based on relative amount of total emissions to statewide total from MassDEP, Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2017.
10 The EPA published that: "…methane is no longer considered to be an emission from aircraft gas turbine engines burning Jet A at higher power settings and is, in fact, consumed in net at these higher powers." [Reference: EPA, Recommended Best Practice for Quantifying Speciated Organic Gas Emissions from Aircraft Equipped with Turbofan, Turbojet, and Turboprop Engines, May 27, 2009 [EPA-420-R-09-901], [https://nepis.epa.gov/Exe/ZyPDF.cgi/P1003YX3.PDF?Dockey=P1003YX3.PDF].

Table 7-13 Estimated Greenhouse Gas Emissions (GHG) Inventory (in MMT of CO_2eq) at Logan Airport, 2019

Source	Category	Scope	CO_2	N_2O	CH_4	Totals
Massport-Controlled Emissions						
Ground Service Equipment[1]	1	1	0.01	<0.01	<0.01	0.01
Massport Shuttle Bus	1	1	<0.01	<0.01	<0.01	<0.01
Massport Express Bus	1	1	<0.01	<0.01	<0.01	<0.01
On-Airport Roadways[2]	1	1	0.04	<0.01	<0.01	0.04
Off-Airport Roadways (Employees)[3]	1	3	<0.01	<0.01	<0.01	<0.01
Parking Lots	1	1	0.01	<0.01	<0.01	0.01
Stationary Sources[4]	1	1	0.03	<0.01	<0.01	0.03
Total Massport Emissions (11.5%)			**0.09**	**<0.01**	**<0.01**	**0.09**
Tenant Emissions						
Aircraft – Ground[5]	2	3	0.23	<0.01	<0.01	0.23
Aircraft – Ground to 3,000 feet[6]	2	3	0.26	<0.01	<0.01	0.26
Aircraft Engine Startup	2	3	0.01	<0.01	–[10]	0.01
Ground Service Equipment	2	3	0.02	<0.01	<0.01	0.02
Auxiliary Power Units	2	3	0.01	<0.01	–[10]	0.01
Off-Airport Roadways (Employees)[3]	2	3	0.03	<0.01	<0.01	0.03
Total Tenant Emissions (68.7%)			**0.55**	**<0.01**	**<0.01**	**0.55**
Purchased Electricity Emissions[7]						
Massport	1	2	<0.01	<0.01	<0.01	<0.01
Tenant/Common Area	2 and 3	2	0.04	<0.01	<0.01	0.04
Total Purchased Electricity Emissions (5.3%)			**0.04**	**<0.01**	**<0.01**	**0.04**
Passenger Vehicle Emissions						
Off-Airport Roadways[3]	3	3	0.12	<0.01	<0.01	0.12
Total Passenger Vehicle Emissions (14.5%)			**0.12**	**<0.01**	**<0.01**	**0.12**
Total Logan Airport Emissions (100%)[8]			**0.80**	**<0.01**	**<0.01**	**0.81**
Percent of Statewide Totals[9]			1.0%	<1.0%	<1.0%	1.0%

Source: Massport and KBE, 2020.

Notes: MMT - million metric tons of CO_2 equivalents (1 MMT = 1.1M Short Tons). CO_2 equivalents (CO_2eq) are bases for reporting the three primary GHGs (e.g., CO_2, N_2O, and CH_4) in common units. Quantities are reported as "rounded" and truncated values for ease of addition.

1 Ground service equipment include the Logan Airport fleet.

2 On-airport roadways based on on-site vehicle miles traveled (VMT) and include all vehicles.

3 Off-airport roadways based on off-site Airport-related VMT and average round trip distances.

4 Other sources include Central Heating and Cooling Plant, emergency generators, snow melters, and live fire training facility.

5 Aircraft – Ground emissions include taxi-in, taxi-out and ground-based delay emissions based on AEDT fuel usages.

6 Aircraft – Ground to 3,000 feet include takeoff, climb out, and approach emissions up to a height of 3,000 feet based on AEDT fuel usages.

7 Emissions from electrical consumption occurs off-airport at power generating plants.

8 Total Emissions = Airport + Tenant + Public.

9 Percentage based on relative amount of total emissions to statewide total from MassDEP, Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2017.

10 The EPA published that: "…methane is no longer considered to be an emission from aircraft gas turbine engines burning Jet A at higher power settings and is, in fact, consumed in net at these higher powers." [Reference: EPA, Recommended Best Practice for Quantifying Speciated Organic Gas Emissions from Aircraft Equipped with Turbofan, Turbojet, and Turboprop Engines, May 27, 2009 [EPA-420-R-09-901], [https://nepis.epa.gov/Exe/ZyPDF.cgi/P1003YX3.PDF?Dockey=P1003YX3.PDF].

Table 7-14 provides GHG data for Logan Airport from 2007 through 2019, by source and by comparison to statewide totals.

Table 7-14 Comparison of Estimated Total Greenhouse Gas (GHG) Emissions (MMT of CO_2eq) at Logan Airport – 2007 through 2019

Source	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Direct Emissions[1]													
Aircraft[2]	0.22	0.21	0.19	0.18	0.19	0.19	0.19	0.20	0.21	0.19	0.21	0.22	0.24
GSE/APUs	0.08	0.08	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.03	0.03	0.03
Motor vehicles[3]	0.03	0.03	0.03	0.03	0.04	0.03	0.05	0.05	0.05	0.05	0.05	0.06	0.06
Other sources[4]	0.04	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Total Direct Emissions	0.37	0.35	0.27	0.27	0.28	0.26	0.29	0.29	0.32	0.29	0.32	0.34	0.36
Indirect Emissions[5]													
Aircraft[6]	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.22	0.24	0.26	0.26
Motor vehicles[7]	0.05	0.05	0.05	0.05	0.06	0.05	0.08	0.07	0.08	0.09	0.10	0.14	0.15
Electrical consumption[8]	0.09	0.08	0.07	0.07	0.08	0.08	0.06	0.06	0.06	0.05	0.05	0.04	0.04
Total Indirect Emissions	0.32	0.30	0.29	0.29	0.30	0.30	0.31	0.30	0.32	0.36	0.39	0.44	0.45
Total Emissions[10]	**0.69**	**0.65**	**0.56**	**0.56**	**0.58**	**0.57**	**0.60**	**0.60**	**0.63**	**0.65**	**0.71**	**0.78**	**0.81**
Percent of State Totals[11]	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	<1%	1%	1%

Sources: Massport and KBE, 2020.

Notes: Totals may not add exactly due to rounding.

MMT – million metric tons of CO_2 equivalents (1 MMT = 1.1M Short Tons). CO_2 equivalents (CO_2eq) are bases for reporting the three primary GHGs (e.g., CO_2, N_2O and CH_4) in common units. Quantities are reported as "rounded" and truncated values for ease of addition.

1 Direct emission are those that occur in areas located within the Airport's geographic boundaries.
2 Direct aircraft emissions-based engine start-up, taxi-in, taxi-out and ground-based delay emissions.
3 Direct motor vehicle emissions based on on-site vehicle miles traveled (VMT).
4 Other sources include Central Heating and Cooling Plant, emergency generators, space heaters, snow melters and live fire training facility.
5 Indirect emissions are those that occur off the Airport site.
6 Indirect aircraft emissions are based on takeoff, climb-out and landing emissions which occur up to an altitude of 3,000 ft., the limits of the landing and takeoff (LTO) cycle.
7 Indirect motor vehicle emissions based on off-site Airport-related VMT and an average round trip distance.
8 Electrical consumption emissions occur off-airport at power generating plants.
9 Total Emissions = Direct +Indirect.
10 Percentage based on relative amount of total emissions to statewide total from MassDEP, Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2017.

Greenhouse Gas (GHG) Emissions Normalized by Passengers and Building Area

Starting with the *2016 EDR*, Massport has augmented its GHG reporting to include the following metrics:

- GHG emissions (Scopes 1 and 2) per passenger (pounds [lbs] of CO_2 per passenger);
- Building energy use intensity (thousand British thermal units (kBTU) per square foot); and
- Building GHG emissions per square foot (lbs CO_2e per square foot).[32]

As shown in **Table 7-14**, total GHG emissions at Logan Airport have increased over the past 10 years as well as the number of passengers passing through the Airport (but at a higher rate). From 2008 to 2018 GHG emissions increased 20 percent and passenger by 57 percent. Similarly, from 2009 to 2019 GHG emissions increased 45 percent and passengers by 67 percent. This trend demonstrates that during the past decade, on a per passenger basis airport-wide GHG emissions have decreased. Specifically, from 2008 to 2018 and 2009 to 2019, GHGs per passengers decrease by 23 percent and 13 percent, respectively.

The total square footage of Logan Airport buildings has also increased over this time-period to more efficiently accommodate growing passenger levels. Normalizing the data by number of passengers and square feet shows that Logan Airport's energy efficiency has increased over time.

Scope 1 and 2 GHG emissions per passenger have decreased by over 37 percent from 2010 to 2019 as shown in **Figure 7-11**, which includes Scopes 1 and 2 emissions only. These emissions are from sources that are owned or controlled by Massport or are from on-Airport electrical consumption.

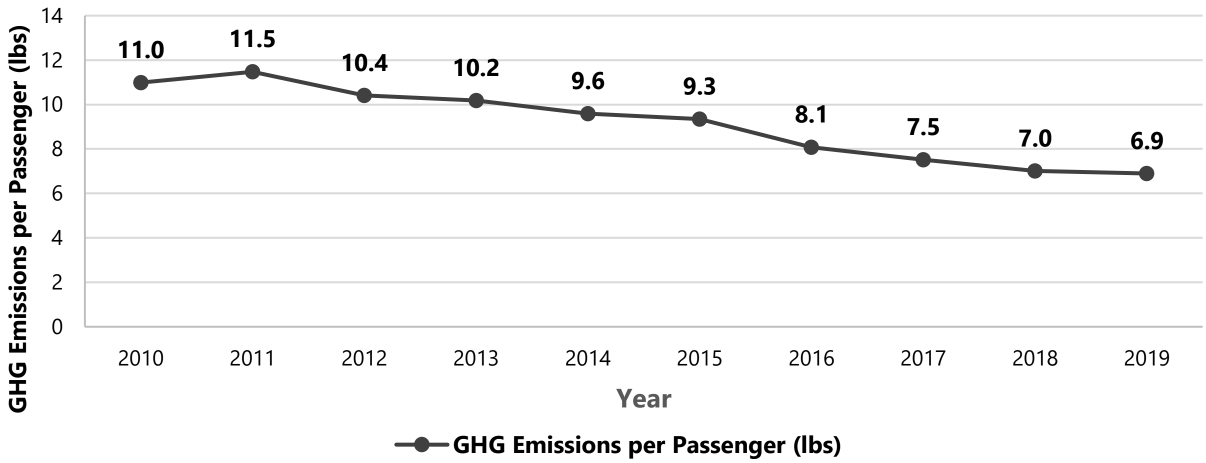
Figure 7-12 shows Logan Airport's building energy use intensity, which is a measure of energy consumption per square foot. Logan Airport's energy use intensity has decreased from 86.7 kBTU in FY2018 to 82.6 kBTU in FY2019. **Figure 7-13** shows Logan Airport's building GHG emissions per square foot, which has decreased from 14.6 lbs CO2e in FY2018 to 14.5 lbs CO2e in FY2019. Building energy is provided from three sources in FY2018: natural gas, fuel oil, and electricity. In FY2019, building energy was also provided by diesel generators. **Figures 7-14** through **7-17** show building energy by source and building GHG emissions by source.

These figures demonstrate that Logan Airport is operating more efficiently over time, shifting to cleaner fuel sources, and serving more passengers in a larger building footprint with less energy. The following Massport initiatives have contributed to this success:

- Commitment to Sustainable Design Standards and Guidelines;
- Constructing and operating facilities to LEED® standards and other green-rating systems;
- Ongoing energy efficiency projects, such as converting to light-emitting diode (LED) lighting and upgrading to energy-efficient heating, ventilation, and air conditioning (HVAC) equipment; and
- Installation of on-site renewable energy sources, including solar and wind.

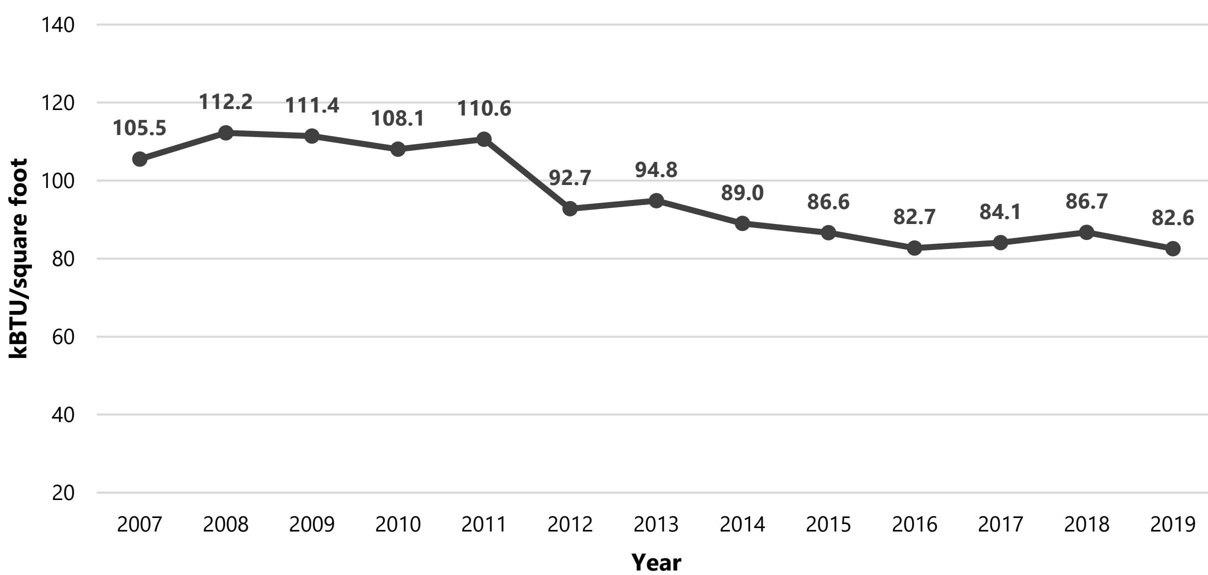
32 Only conditioned (heated and cooled), enclosed building areas are included in the building energy use intensity and GHG emission graphs.

Figure 7-11 GHG Emissions (Scopes 1 and 2) per Passenger (lbs CO_2e), 2010-2019



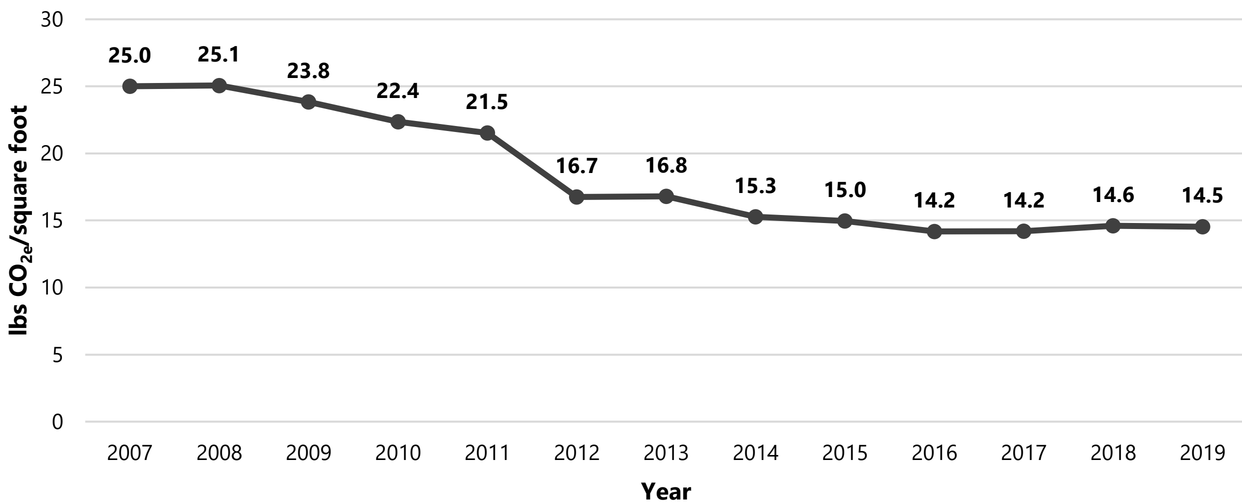
Source: Massport, 2020.
Note: Includes Scopes 1 and 2 data as shown in Table 7-13.

Figure 7-12 Building Energy Use Intensity (kBTU/Square Foot), FY 2007-2019



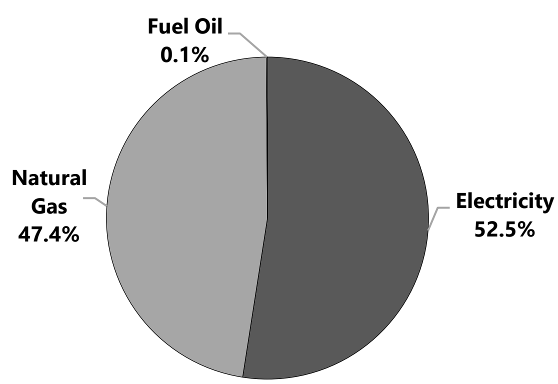
Source: Massport, 2020.
Notes: kBTU = thousand British thermal units. Electricity (and therefore energy total) has accounted for renewables by taking credit for avoided GHGs for that portion of energy. Therefore, total energy includes some energy that is generated by renewables (with the exception of those that are under Power Purchase Agreements [PPAs]), but the energy total used to calculate GHGs excludes Renewable Energy Credit (REC) purchases and non-PPA on-site renewable generation.

Figure 7-13 Building GHG Emissions (lbs CO_2e) per Square Foot, FY 2007-2019



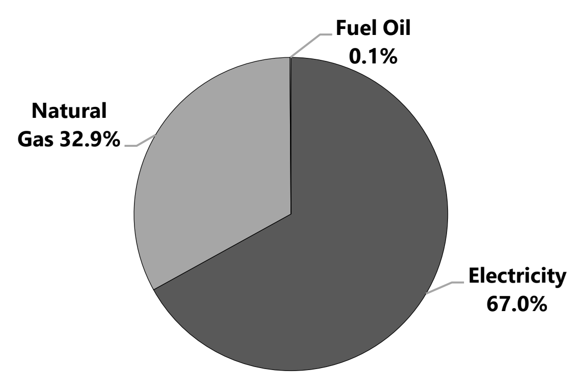
Source: Massport, 2020.
Notes: Electricity (and therefore energy total) has accounted for renewables by taking credit for avoided GHGs for that portion of energy. Therefore, total energy includes some energy that is generated by renewables (with the exception of those that are under Power Purchase Agreements [PPAs]), but the energy total used to calculate GHGs excludes Renewable Energy Credit (REC) purchases and non-PPA on-site renewable generation.

Figure 7-14 FY2018 Building Energy Sources



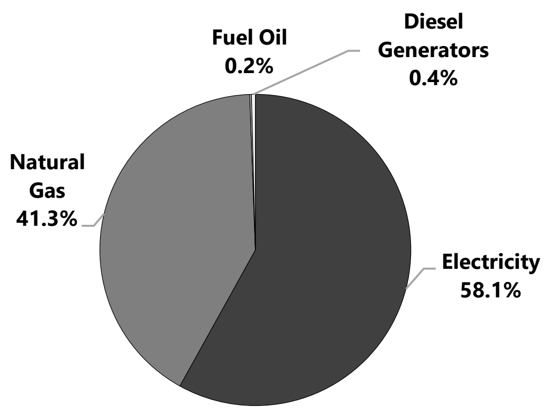
Source: Massport, 2020.

Figure 7-15 FY2018 Building Greenhouse Gas Emission Sources



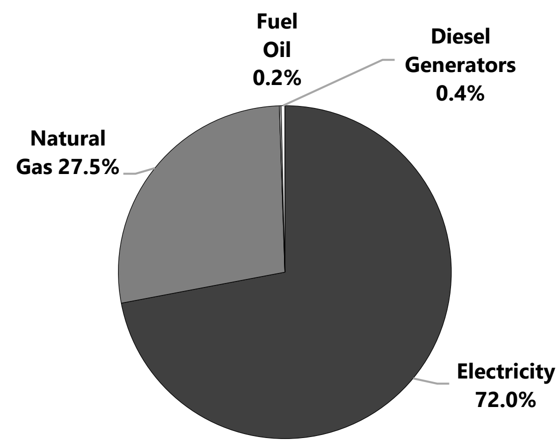
Source: Massport, 2020.

Figure 7-16 FY2019 Building Energy Sources



Source: Massport, 2020.

Figure 7-17 FY2019 Building Greenhouse Gas Emission Sources



Source: Massport, 2020.

Air Quality Emissions Reduction

As part of implementing and advancing its ongoing air quality management strategy for Logan Airport, Massport has established a number of goals and objectives to address air emissions from Airport operations, including the minimization of Airport-related emissions through the reduction of GSE and Massport vehicle fleet emissions. This section presents an update on these initiatives at Logan Airport.

Alternative Fuel Vehicles (AFV) Program

A component of Massport's Air Quality Management Program is the AFV Program. The AFV Program is designed to replace Massport's conventionally fueled fleet with alternatively fueled or powered vehicles, when feasible, to help reduce emissions associated with Logan Airport operations. Massport now operates 103 vehicles powered by CNG, propane, E85 flex fuel, diesel/electric hybrid, gasoline/electric hybrid, and plug-in electric. Massport also established a vehicle procurement policy in 2006 that requires consideration of AFVs when purchases are made. For example, beginning in 2013, as part of the Southwest Service Area (SWSA) redevelopment, the existing fleet of diesel rental car shuttle buses was replaced by CNG or clean diesel-electric hybrid buses. In 2017, two CNG Honda Civics were retired. The remaining seven were retired in 2019 and replaced with seven plug-in electric hybrid vehicles.

The remaining CNG pick-up trucks and vans were retired in 2018. **Table 7-15** shows the number of Massport AFVs by vehicle type in 2017. As discussed in Chapter 1, *Introduction/Executive Summary,* several projects and programs support AFVs at Logan Airport including:

- The replacement of 96 diesel rental car buses and older CNG buses with a fleet of 54 alternative fuel (diesel-electric hybrids and newer generation CNG) buses, serve the new Rental Car Center (RCC), Massport terminals, and other airport shuttle routes.
- Operation for almost two decades of one of the largest privately operated, publicly accessible, CNG stations in New England. In 2018 and 2019, the station dispensed approximately 25,750 and 24,445 gasoline-equivalent gallons per month for Massport vehicles in 2018 and 2019, respectively.
- Massport has committed to increasing the availability of EV charging stations so that 150 percent of this demand is available at all facilities, at all times. Massport will continue to evaluate this as passenger activity returns. Currently, there are 123 charging ports Massport wide. Massport's charging stations include (note some stations have multiple ports):
  - 53 dual stations at Level 2
  - 19 dual stations in the Central Garage
  - 10 dual stations in the Terminal B Garage
  - One dual station at Logan Facilities 2 building
  - 10 dual stations in the Economy Garage
  - One dual station at the Taxi Pool
  - One dual station at the RideApp Lot
  - 11 dual stations in the Logan Office Center (LOC) garage
- The installation of a total of 129 eGSE in service at Logan Airport.[33] As part of its long-range emission reduction strategy, Massport is working with the airlines to replace commercially-available GSE with electric alternatives by the end of 2027.
- Continued operation of Massport's "Clean-Air-Cab" incentive program for AFVs, which allows hybrid or alternative fuel taxis to go to the head of the taxi line to serve passengers.

In addition, Logan Airport's Green Bus Depot is designed to maintain the expanded CNG-fueled and clean diesel-electric hybrid shuttle bus fleet. Since 2007, Massport also offers preferred parking for customers driving hybrid and AFVs.

33 Based on Massport's 2019 Vehicle Aerodrome Data for Logan Airport.

Table 7-15 Massport's Alternative Fuel Vehicle Fleet (AFV) Inventory at Logan Airport

Fuel Type	Vehicle	2018	2019
Diesel/Electric Hybrid	Shuttle Bus[1]	32	32
Compressed Natural Gas (CNG)	CNG NABI Bus[2]	22	22
Gasoline/Electric Hybrid	Ford Escape	2	4
Propane	Non-Road Vehicles (Forklifts)	1	1
E85 Flex Fuel	Pick-Up Truck	18	30
	Van	2	2
	Ford Escape	2	3
Plug-in Electric Hybrid	Chevy Volt[3]	2	9
	Total	**81**	**103**

Source: Massport, 2020.
1 The 32 diesel/electric hybrid shuttle buses, added to the fleet in 2013, replaced the diesel rental car buses.
2 The CNG NABI buses replaced the 26 aging CNG shuttle buses.
3 The Chevy Volt Plug in electric hybrid vehicles replaced the CNG Honda Civics.

Air Quality Management Goals

Massport's air quality management strategy for Logan Airport focuses on decreasing emissions from Airport-related sources, in addition to furthering innovative means to achieve emissions reductions Airport-wide. Massport's air quality improvement goals, the measures proposed to accomplish them, and some of the 2019 milestones are listed in **Table 7-16**. Massport continues to comply with the Logan Airport Parking Freeze,[34] in accordance with 10 Code of Massachusetts Regulations 7.30 and 40 Code of Federal Regulations 52.1135. Chapter 5, *Ground Access to and from Logan Airport,* provides detailed discussion of Massport's compliance with the Parking Freeze regulation, and the counterproductive effect of constrained parking at Logan Airport on VMT and associated emissions.

34 310 Code of Massachusetts Regulations 7.30 and 40 Code of Federal Regulations 52.1120.

Table 7-16 Air Quality Management Strategy Status

Air Quality Emissions Reduction Goals	Plan Elements	2019 Status
Reduce emissions from Massport fleet vehicles	Convert Massport fleet vehicles to electricity or compressed natural gas (CNG) by retrofitting or procurement.	Massport is facilitating the replacement of gas- and diesel-powered ground service equipment (GSE) with all-electric versions. All GSE at the Airport will be replaced by electric equivalents by the end of 2027, as commercially available. The U.S. Environmental Protection Agency (EPA) awarded a $541,817 grant in 2018 to Massport under the Diesel Emission Reduction Act (DERA) to replace gas- and diesel-powered GSE at Logan Airport in a collaborative effort to reduce emissions and improve air quality. American Airlines will contribute the entire match and Massport will provide support in the way of grant administration and data tracking. This grant will allow Massport to replace 25 pieces of diesel-powered GSE with all-electric versions. This grant will be used in conjunction with a Federal Aviation Administration (FAA) grant Massport received in the fall of 2018 to install electric GSE (eGSE) charging stations for the Terminal B Optimization Project. Additionally, in 2019 Massport was awarded by the EPA under DERA a $990,000 grant to replace 44 diesel-powered GSE equipment with all-electric baggage tractors, belt loaders, and push back tugs. GSE owners at Logan Airport will contribute a $1,210,000 match.[1] In 2018, Massport was awarded through FAA's Voluntary Airport Low Emission Program (VALE) $1,600,000 for American Airlines' charging infrastructure at Terminal B, Massport contributed $626,000 in matching funding to install 50 eGSE charging stations. In 2019, through the same program, Massport was awarded $3,200,000 for jetBlue Airways' charging infrastructure at Terminal C, Massport contributed $953,000 toward the installation of 42 eGSE charging stations. In 2019, Massport was awarded through the Massachusetts Department of Environmental Protection's (MassDEP's) Volkswagen Diesel Settlements & Environmental Mitigation Open Solicitation grant program, aimed at reducing nitrogen oxide (NO_X) and greenhouse gas (GHG) emissions, $445,000 to acquire eGSE in partnership with jetBlue, this will replace 31 pieces of GSE with new eGSE and install four eGSE charging stations at Terminal C. United Airlines also privately pursued this grant and was awarded $280,000.
Encourage use of alternative fuel and alternative power vehicles by private fleet and airside service vehicle owners	Provide infrastructure to support alternative fuels including CNG and electricity.	Massport continues to operate one of New England's largest retail CNG stations, which is open to the public. In calendar years 2018 and 2019, the CNG station pumped approximately 25,750 and 24,445 gasoline-gallon equivalents per month for all Massport fleet vehicles (non-Massport vehicles were also using CNG). Massport plans to support the current and future standard systems for plug-in electric vehicles (EVs). Currently, there are 123 charging ports installed at Logan Airport and more at the Logan Express sites.

Table 7-16 Air Quality Management Strategy Status (Continued)

Air Quality Emissions Reduction Goals	**Plan Elements**	**2019 Status**
Encourage use of alternative fuel and alternative power vehicles by private fleet and airside service vehicle owners	Work with ground access fleet and airside service-vehicle owners to encourage conversion.	Massport encourages conversion to AFVs/APVs by others through such policies as 50-percent discounts in AFV/APV ground access fees to limousines, vans, and buses; limited "front-of-line" taxi pool privileges to hybrid and AFVs/APVs; and preferred parking for hybrid and AFVs/APVs at Logan Airport parking facilities.
Minimize emissions from motor vehicles	Implement a program to increase high occupancy vehicle (HOV) ridership by air passengers.	As described in detail in Chapter 5, *Ground Access to and from Logan Airport,* there are a number of HOV services serving Logan Airport that are aimed at air passengers, including the Massachusetts Bay Transportation Authority (MBTA) Blue Line and Silver Line, Logan Express, and water transportation. Massport promotes the use of these services by employees and passengers, primarily through various pricing incentives. Massport has developed a robust strategy to increase HOV options and use. More information about this strategy can be found in Chapter 5, *Ground Access to and from Logan Airport*. Massport provides free, clean-fuel shuttle bus service for passengers and employees between the MBTA Blue Line Airport Station, all terminals, the Rental Car Center, and the Logan Airport water transportation dock along Harborside Drive.
	Expand the Logan Transportation Management Association (TMA) for Airport employees.	Massport continues to provide commuting information to all Airport employees including Sunrise and Logan Express Shuttles with reductions in employee parking. Logan Express extended service now provides nearly 24-hour service at several Logan Express locations, with significant discounts provided to Airport-wide and Massport employees.
	Encourage employees to use bicycling as a mode of commuting.	Massport includes bike racks at all new facilities and at appropriate existing facilities to promote employees biking to work. Bicycle racks are currently provided at the RCC, Terminal A, Terminal E, Logan Office Center, MBTA's Airport Station, Economy Parking Garage, Signature general aviation facility, and the Green Bus Depot (Bus Maintenance Facility).
Minimize emissions from Construction Equipment	Incorporate Clean Air Construction Initiative (CACI) into major earthwork construction projects.	For all large construction projects, heavy construction equipment is required to be equipped with diesel particulate filters or diesel oxidation catalysts in accordance with CACI.
Reduce emissions from fuel vapor loss	Provide state-of-the-art fuel storage and distribution equipment.	The Fuel Storage and Distribution System is in operation.
	Implement Tank Management Program.	Refer to Chapter 8, *Environmental Compliance and Management/ Water Quality,* which provides details regarding tank management focuses on proper maintenance.
	Employ Reasonable Available Control	RACT policies have been implemented.

Table 7-16 Air Quality Management Strategy Status (Continued)

Air Quality Emissions Reduction Goals	Plan Elements	2019 Status
Reduce emissions from stationary sources	Technologies (RACT) for NO_X at Central Heating and Cooling Plant.	
	Use alternative fuels in snow melters.	Massport is required to use Ultra Low Sulfur Diesel (ULSD) fuel in all Massport snow melting equipment. Massport installed two new stationary snow melters using natural gas in 2016 and two additional snow melters became operational in December 2019. These installations will reduce the need for ULSD fuel fired portable snow melters.
	Incorporate green building technologies and energy use reduction strategies.	Logan Airport has five U.S. Green Building Council (USGBC)'s Leadership in Energy and Environmental Design (LEED®) certified facilities: Terminal A (the first LEED® certified terminal in the world), the Signature Flight Support General Aviation (GA) Facility, the Green Bus Deport (LEED® Silver certified), the RCC (LEED® Gold), and a recently renovated portion of Terminal E (LEED® Gold). An overview of sustainability initiatives is presented in Chapter 1, *Introduction/Executive Summary*.
	Install diesel particulate filters on large emergency generators	Massport has voluntarily installed diesel particulate filters on all large (>500 kilowatts) stationary emergency generators beginning in 2011.
Reduce aircraft emissions	Work with FAA to study and implement airfield-improvement concepts and operational changes that may have air quality benefits.	Massport promoted such concepts through the *Logan Airside Improvements Planning Project Environmental Impact Statement*, which recommended physical and operational improvements to Logan Airport including construction of the new Runway 14-32 and Centerfield Taxiway, and taxiway improvements. Runway 14-32 became operational in November 2006 and the Centerfield Taxiway was fully opened in summer of 2009. In addition, in coordination with Massport, the Massachusetts Institute of Technology (MIT) completed a detailed survey of pilots at Logan Airport to better understand the use of single engine taxiing and issued a paper in March 2010, and in January 2011, MIT published a paper on aircraft pushback control strategies to reduce congestion and taxi delay. In addition to airside improvements including Midfield Taxiway and the MIT study on single engine taxiing Massport continues to: - Promote single engine taxiing directly to chief pilots and airlines when safe - Collaborate with MIT on national research on reducing departure queues on the airfield. Logan Airport related work is complete and is now being tested at other airports. - Conduct a runway incursion mitigation study to include potential for holding pads at appropriate locations to reduce aircraft queues at runway ends (and closer to communities). - Manage a new engine run up location at the end of Runway 14-32 away from communities

Table 7-16 Air Quality Management Strategy Status (Continued)

Air Quality Emissions Reduction Goals	Plan Elements	2019 Status
Reduce aircraft emissions	Use of pre-conditioned air (PCA) at new and renovated terminals and terminal gates.	All contact gates have pre-conditioned air and/or 400-Hz power. This reduces the need for auxiliary power unit (APUs), and consequently reduces associated emissions. The recent improvements of Terminal B included the installation of pre-conditioned air at all renovated gates.
Reduce energy intensity and greenhouse gas (GHG) emissions while increasing portion of Logan Airport's energy generated from renewable sources	Reduce energy consumption Increase the portion of Massport's energy being generated from renewable sources Reduce overall GHG emissions associated with energy consumed in Massport operated facilities at Logan Airport Reduce GHG emissions from Massport-operated mobile sources	This goal was identified as part of the Logan Airport Sustainability Management Plan (SMP)[2], which was released in April 2015. In the 2018 Annual Sustainability & Resiliency Report, Massport identified several policies and initiatives its implementing to achieve this goal, including pursuing LEED® accreditation for new projects and upgrading to energy-efficient heating, ventilation, and air conditioning (HVAC) systems. As of FY2017, Massport had achieved a 46 percent reduction in GHG emissions per passenger, exceeding its 2020 target by about 6 percent. Massport also reduced its energy use per passenger by 26 percent and energy use per square foot by 25 percent, reaching its goal of a 25-percent reduction by 2020. Progress on this goal will be reported in future sustainability reports.

Source: Massport, 2020.

1 EPA, National DERA Awarded Grants, https://www.epa.gov/dera/national-dera-awarded-grants.

2 Progress towards goals identified as part of the Logan Airport Sustainability Management Plan (SMP) will be reported separately, as part of Massport's annual sustainability reporting.

Updates on Other Air Quality Efforts

This section further highlights updates on other Logan Airport-related air quality efforts in 2019 and current studies on aviation-related air quality and public health issues.

Massachusetts Department of Public Health Study

In 2004, the Massachusetts Legislature appropriated funds for the Department of Public Health (DPH) to undertake an assessment of potential health impacts of Logan Airport in the East Boston section of the city and any other communities located within a five-mile radius of the Airport, with a focus on noise and air quality. This study was completed in May 2014 and consisted of an epidemiological survey combined with computer modeling of noise levels and air pollution concentrations. Massport has cooperated in this effort by providing funding to complete the study and Airport operational data in support of the study. In the spring of 2011, Massport also gave technical assistance in support of the DPH study by providing geographic information systems (GIS) analysis of the roadway network in and around Logan Airport in a format compatible with FAA's

EDMS. Massport is working with DPH and the East Boston Health Center on implementing DPH recommendations related to Massport.

In response to the DPH study recommendations, Massport has:

- Entered into an agreement to provide funding to the East Boston Neighborhood Health Center to help expand the efforts of their Asthma and Chronic Obstructive Pulmonary Disease (COPD) Prevention and Treatment Program in East Boston and launch a program in Winthrop that provides services including screenings for children, distribution of asthma kits, and home visits, among others.
- Entered into an agreement with the Massachusetts League of Community Health Centers for the evaluation and assessment of the Asthma and COPD Prevention and Treatment Program, and engagement of community health centers in the North End, Charlestown, Chelsea, and South Boston. The East Boston Neighborhood Health Center will conduct the same evaluations for the East Boston and Winthrop community programs.
- Entered into an agreement with DPH to expand or establish the Asthma and COPD Prevention and Treatment Program in South Boston, the North End, Chelsea, and Charlestown in collaboration with the Massachusetts General Hospital, South Boston Neighborhood Health Center, and conduct training on the Community Health Worker assessments.

The findings from this study can be viewed from DPH website at: http://www.mass.gov/eohhs/docs/dph/environmental/investigations/logan/logan-airport-health-study-final.pdf.

Recent Studies on Impacts of Aviation Emissions on Air Quality and Public Health

Massport continues to stay apprised on studies regarding impacts of aviation on air quality and public health. A recent study conducted by Tufts University, *Impacts of Aviation Emissions on Near-Airport Residential Air Quality*,[35] examined CO, CO_2, NO, NO_2, $PM_{2.5}$, black carbon, and UFPs at a residence near Logan Airport. The residence was located under a flight trajectory of the most utilized runway configuration. The study showed that gaseous and particulate pollutant concentrations were higher at the residence when it was downwind compared to when it was not.

Olin College is collaborating with Air Inc. and the Town of Winthrop to monitor air quality in the community. Monitors were located in Winthrop to continuously measure pollutants such as carbon monoxide (CO), carbon dioxide (CO_2), nitric oxide (NO), nitrogen dioxide (NO_2), and ozone (O_3), as well as the mass concentration of fine and coarse particulate matter ($PM_{2.5/10}$), and all relevant meteorological conditions. The Olin College students are analyzing the monitoring data. Massport has provided operational data on request and will continue to collaborate when asked.

Additionally, as discussed in previous sections, two recent studies were conducted by the University of Southern California and the University of Washington. The study performed by the University of Southern

35 Neelakshi Hudda et al, "Impacts of Aviation Emissions on Near-Airport Residential Air Quality", Environ. Sci. Technol. 2020, 54, 8580−8588, doi.org/10.1021/acs.est.0c01859.

California, demonstrated adverse health effects following exposure to airport and roadway traffic-related UFPs near Los Angeles International Airport. The study led by the University of Washington was conducted to understand the air quality impacts of air traffic for communities located near and below the flight paths of Seattle-Tacoma International Airport. The findings show key differences exist in the particle size distribution and the black carbon concentration for roadway and aircraft features.

Single Engine Taxiing

Single engine taxiing is one measure that is being used by air carriers to help reduce fuel use and emissions. As a result, Massport supports the use of single engine taxiing when it can be done safely, voluntarily and at the discretion of the pilot. Massport has conducted three surveys of Logan Airport air carriers (2006, 2009, and 2010) to understand the extent single engine taxiing is used at Logan Airport. In addition, Massport was an active member of the FAA Partnership for Air Transportation Noise and Emissions Reduction (PARTNER) program on reducing noise and emissions.[36] In 2009, Massport offered to facilitate a more detailed survey of pilots at Logan Airport by the Massachusetts Institute of Technology (MIT) to better understand the use of single engine taxiing. MIT completed its survey and issued a paper in March 2010, which was provided in the *2009 EDR*. The MIT survey confirms earlier Massport survey findings that single engine taxiing is an important operational measure used by airlines to conserve fuel and is extensively used at Logan Airport. MIT issued a paper in January 2011 reporting on a control strategy to minimize airport surface congestion, and thus taxiing time, by regulating the rate at which aircraft are pushed back from their gates. Also, in January 2011, Massport sent a memorandum to air carriers in support of single engine taxiing when consistent with safety procedures. The memorandum highlighted best practices for single engine taxiing use based on the MIT survey findings. In May 2017, May 2018, and June 2019, Massport sent additional memoranda to air carriers in support of single/reduced-engine taxiing and the use of idle reverse thrust as strategies. Copies of these memoranda are provided in Appendix L, *Reduced/Single Engine Taxiing at Logan Airport Memoranda*.

MIT and the Center for Air Transportation Systems Research developed a methodology to account for single engine taxi procedures during the taxi-in or -out modes.[37,38,39] Some of the single engine taxi challenges noted in these studies include: (1) excessive thrust and associated issues; (2) maneuverability problems particularly related to tight taxiway turns and weather; (3) problems starting the second engine; and (4) distractions and workload issues. Thus, pilots do not use single engine taxiing during each aircraft operation in practice, and when they do use it, it is not for the entire operation. Pilots use single engine taxiing even less often when taxiing out.

36 The Partnership for AiR Transportation Noise and Emissions Reduction (PARTNER) — was a leading aviation cooperative research organization headquartered at the Massachusetts Institute of Technology (MIT). An FAA Center of Excellence, PARTNER was sponsored by the FAA, NASA, Transport Canada, the U.S. Department of Defense, and the U.S. Environmental Protection Agency. In December 2015, PARTNER completed its Center of Excellence mandate and research. The ASCENT FAA Center of Excellence is now conducting similar research. Currently Massport is a member of the ASCENT Advisory Committee.

37 Massachusetts Institute of Technology. 2010. *A Survey of Airline Pilots Regarding Fuel Conservation Procedures for Taxi Operations*.

38 Massachusetts Institute of Technology. 2008. *Opportunities for Reducing Surface Emissions through Airport Surface Movement Optimization*.

39 Center for Air Transportation Systems Research. *Analysis of Emissions Inventory for Single Engine Taxi-out Operations*. 2009.

When applying the MIT methodology and available data (such as aircraft pilot surveys) to the most recent set of aircraft operational data for Logan Airport (i.e., 2018 and 2019), the results show a savings of approximately 2,000,932 gallons in 2018 and 2,241,595 gallons in 2019 of jet fuel. This translates to a reduction of approximately 19,668 and 22,034 metric tons of GHG emissions associated with this initiative in 2018 and 2019, respectively.

Engagement in Aviation-Related Environmental Issues

Massport maintains memberships and active participation in a number of organizations involved in addressing aviation-related environmental issues, including air quality. These include environmental committees for TRB, the American Association of Airport Executives (AAAE), and the Airports Council International-North America (ACI-NA).

Black Carbon (BC)

Particulate matter at all sizes is comprised of multiple components, one of the more significant being BC. BC particles, also referred to as soot, form as a result of incomplete combustion, particularly at the higher temperatures at which aircraft burn fuel, making BC emissions common from aircraft. BC from aviation activities largely contributes to smaller PM particles (i.e., $PM_{2.5}$ and UFPs). $PM_{2.5}$ is classified as a criteria air pollutant by EPA and regulated under NAAQS.

BC is known to have negative impacts on both human health and the environment. According to EPA, BC is associated with respiratory distress, cardiovascular disease, cancer, and birth defects. A recent study using air quality monitors near an airport has shown that airports can contribute to 24 to 28 percent of total BC within 4 km.[40] However, modeling studies, commonly used to ascertain the extent of impacts on human health and the environment, have shown the level of contribution by an airport to be less, only on the order of 2 to 5 percent. Researchers are working on understanding the reasons for this discrepancy. It may be an indication that emissions estimates from airports need improvement.[41]

To fully understand the extent of impacts from airport-related BC emissions much more research is needed. It is important for research to focus on improving emissions estimates of BC from airports and improved modeling studies. FAA conducts research through the ASCENT program on BC.

40 Dodson R. E.; Houseman E. A.; Morin B.; Levy J. I. 2009. *An analysis of continuous black carbon concentrations in proximity to an airport and major roadways.* Atmos. Environ, 43243764–3773.

41 Arunachalam S.; Valencia A.; Yang D.; Davis N, Baek B.H.; Dodson R.E.; Houseman A.E.; Levy J.I. 2011. *Comparing Monitoring-Based and Modeling-Based Approaches for Evaluating Black Carbon Contributions from a US Airport.* Air Pol. Mod, 619-623

Climate Change Adaptation and Resiliency

In 2013, Massport launched a comprehensive resiliency initiative to maximize business continuity in the midst of various human and natural threats. Massport's efforts are guided by the following goals:

- Improve resiliency for overall infrastructure and operations;
- Restore operations during and after disruptive events in a safe and economically viable time frame;
- Create robust feed-back loops that allow new solutions as conditions change;
- Inform operations and policy, and implement design/build decisions, through the application of sound scientific research and principles that consider threats, vulnerabilities, and cost-benefit calculations;
- Become a knowledge-sharing exemplar of a forward-thinking, resilient port authority; and
- Work with key influencers and decision makers to strengthen understanding of the human, national, and economic security implications of extreme weather, changing climate, and anthropogenic threats to Massport's facilities and the region.

Statewide, National, and International Initiatives

Advancements on the national and international levels to decrease Airport-related air emissions have continued to focus primarily on three initiatives: the advanced quantification of PM and hazardous air pollutants (HAPs) emissions from aircraft engines; the continued phasing-in of AFV; and the implementation of GHG emissions reduction strategies. These initiatives are briefly described below.

- **PM and Hazardous Air Pollutant Research** – Conducted by the International Civil Aviation Organization (ICAO), FAA, EPA, and others, research continues to better characterize PM and HAPs emissions (including lead) from aircraft engines. Similarly, air quality monitoring efforts at other airports were also conducted at various locations to advance what are known about ambient levels of these air pollutants in the vicinities of airports. Massport continues to closely track these issues through its involvement in aviation industry organizations such as ACI-NA and AAAE.

- **AFV Conversions** – Airlines and other GSE users are continually replacing their older fossil-fueled vehicles and equipment with more fuel-efficient, low- and non-emitting (e.g., electric) technologies. Airport-fleet vehicles are also being converted to alternative fuels (e.g., electric, propane). In response, GSE and automobile manufacturers are offering a wider selection of AFVs, many of which are designed specifically for airport use. Massport continues to support the conversion of fossil-fueled vehicles and equipment to alternative, electric, or lower-emitting fuels. Massport is replacing all commercially-available diesel-powered GSE to all-electric versions by the end of 2027. In 2018, EPA awarded a $541,817 grant under the Diesel Emission Reduction Act (DERA) to Massport to replace gas- and diesel-powered GSE at Logan Airport in a collaborative effort to reduce diesel emissions and improve air quality. This grant will allow Massport to assist American Airlines with the replacement of 25 pieces of diesel-powered GSE with all-electric versions. This grant will be used in conjunction with an FAA grant Massport received in the fall of 2018 to install eGSE charging stations for the Terminal B Optimization Project. In 2019, Massport was awarded by EPA under DERA a $990,000 grant to replace

44 diesel-powered GSE equipment with all-electric baggage tractors, belt loaders, and push back tugs. Massport contributed a $1,210,000 match.

- **Participation in Massachusetts Climate Protection Plan** – Massport was one of 15 state agencies and authorities that participated in the development of the State's Climate Protection Plan, the Commonwealth's initial step towards reducing GHG emissions. Reduction strategies included:
  - Incorporating energy use and GHG emissions as criteria in transportation decisions;
  - Maintaining and updating public transit systems;
  - Expanding programs to promote efficient travel;
  - Seeking opportunities to reduce emissions at Logan Airport;
  - Improving aircraft movement efficiency;
  - Promoting the use of cleaner vehicles and fuels in public transit fleets;
  - Continuing to promote the use of clean diesel equipment on publicly-funded construction projects;
  - Eliminating unnecessary idling of buses; and
  - Advocating for aircraft efficiency at regional and national levels.
- **Sustainable Aviation Fuels (SAFs)** – International Air Transport Association (IATA) approved a resolution for the governments to continue in implementing the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). To achieve a carbon-neutral growth, this initiative sets a cap on net CO_2 emissions generated from international aviation at 2020 levels. Airlines are also encouraged to use biofuels, or other sustainable aviation fuels, as a fuel efficiency measure.[42] In May 2019, United Airlines agreed to purchase up to 10 million gallons of cost-competitive, commercial-scale, sustainable aviation biofuel over the next two years. Currently, every United Airlines flight out of Los Angeles International Airport are powered by biofuel. United Airlines has renewed its contract with Boston's World Energy, a biofuel producer, to help achieve its commitment to reducing its GHG emissions by 50 percent by 2050.[43]
- **Climate Change Technology Standards[44]** – In October 2010 the 37th Assembly (Resolution A37-19) requested the development of an ICAO CO_2 Emissions Standard. Following six years of development, ICAO's Committee on Aviation Environmental Protection (CAEP) at its tenth meeting recommended an airplane CO_2 emissions certification Standard. This new standard is part of the ICAO "Basket of measures" to reduce GHG emissions from the air transport system, and it is the first global technology Standard for CO_2 emissions for any sector with the aim of encouraging more fuel-efficient technologies into airplane designs. After adoption by the ICAO Council, the new airplane CO_2 emissions certification Standard was published as an official CO_2 Standard in 2017. The Standard applies to subsonic jet and

42 Biofuels international, IATA resolution urges airlines to switch to sustainable aviation fuels. June 3, 2019. https://biofuels-news.com/display_news/14744/iata_resolution_urges_airlines_to_switch_to_sustainable_aviation_fuels/.

43 Good News Network, As Only US Airline to Use Biofuel on Regular Basis, All United Flights from LA Are Now Powered by Biofuel. June 10, 2019. https://www.goodnewsnetwork.org/united-airlines-flights-from-la-powered-by-biofuel/.

44 ICAO, Environment, Climate Change Technology Standards, 2020. https://www.icao.int/environmental-protection/Pages/ClimateChange_TechnologyStandards.aspx.

turboprop airplanes that are "new type" designs from 2020. It will also apply to "in-production" airplanes from 2023 that are modified and meet a specific change criterion. This is subsequently followed up by a production cut-off in 2028, which means that in-production airplanes that do not meet the standard can no longer be produced beyond 2028 unless the designs are modified to comply with the Standard.

8

Environmental Compliance and Management/ Water Quality

During the 2018/2019 period, Boston Logan International Airport (Logan Airport or the Airport) (and the aviation industry in general) continued to see the strong growth experienced over the past few years. The COVID-19 pandemic, which began to be felt in mid-March 2020 has, however, reversed this trend with dramatic reductions in Logan Airport passenger levels and flights. As of the filing of this Environmental Data Report (EDR), Logan Airport continued to be one of the nation's airports experiencing the most dramatic reductions. Beginning in March 2020, flights in and out of Logan Airport were dramatically reduced and passenger levels dropped by over 90 percent at the peak of the pandemic in the spring and summer of 2020. Despite the drop in passenger activity levels and aircraft operations, Massport continues to operate the airport in a safe manner, compliant with environmental regulations. Massport continues to carefully review Airport activity levels and remains committed to implementing project-related mitigation strategies, as documented in this chapter.

Key Findings for 2018 and 2019
▪ The Massachusetts Port Authority (Massport) promotes appropriate environmental practices through pollution prevention and remediation measures. Massport also works closely with tenants and operations staff at Boston Logan International Airport (Logan Airport or the Airport) in an effort to continuously improve environmental compliance.
▪ In 2018, 97 percent of Massport's stormwater samples were in compliance with National Pollutant Discharge Elimination System (NPDES) permit requirements and in 2019, 99 percent were in compliance.
▪ Massport has had its International Organization for Standardization (ISO) 14001 Environmental Management System (EMS) in place since 2006.
▪ Massport annually updates and maintains its Stormwater Pollution Prevention Plan (SWPPP) for Logan Airport.
▪ Massport continues to assess, remediate, and bring its Massachusetts Contingency Plan sites to regulatory closure.
▪ In 2018, there were eight reportable spills with six storm drains impacted. In 2019, there were 22 reportable spills with nine storm drains impacted. None of the catch basin impacts resulted in a sheen to the surface water. There was a 4.1 percent increase in fuel delivery from 2018 to 2019.

Introduction

Massport's approach to environmental management and compliance is a key component of its commitment to sustainability and responsible stewardship at Logan Airport (refer to Chapter 1, *Introduction/Executive Summary*, for details). Through monitoring and documentation, Massport assesses environmental performance, continually developing, implementing, evaluating, and improving policies and programs. In October 2000, the Massport Board approved a Massport-wide Environmental Management Policy, which articulates the agency's commitment to protect the environment and to implement sustainable design principles:

> *"Massport is committed to operate all of its facilities in an environmentally sound and responsible manner. Massport will strive to minimize the impact of its operations on the environment through the continuous improvement of its environmental performance and the implementation of pollution prevention measures, both to the extent feasible and practicable in a manner that is consistent with Massport's overall mission and goals."*

Massport's overall environmental compliance and management efforts include:

- Environmental inspections and recommendations to rectify identified issues;
- Compliance with the EMS and ISO 14001;
- Continued publication of the *Sustainable Massport* newsletters;
- Annual updates of the Logan Airport SWPPP and training for personnel responsible for implementing activities identified in the SWPPP;
- Development of sustainable design standards and guidelines (SDSGs) for architects, engineers, and planners; and
- Development of a Spill Prevention Control and Countermeasure (SPCC) plan for its facilities that store petroleum products.

These efforts help achieve the following goals:

- Protect water quality Airport-wide;
- Protect groundwater resources;
- Protect surface waters (Boston Harbor) and coastal resources adjacent to the Airport;
- Minimize air quality impacts;[1]
- Protect environmental resources during construction;
- Mitigate construction impacts; and
- Reduce occurrences of fuel leaks and spills.

Massport is responsible for complying with applicable state and federal environmental laws and regulations. This chapter reports on Massport's environmental programs pertaining to environmental compliance and management and water quality, which include:

1 Air quality conditions are reported in Chapter 7, *Air Quality/Emissions Reduction*.

- EMS implementation;
- Sustainability Management Plan (SMP) implementation;
- Water quality and stormwater management;
- Fuel use and spills;
- Storage tank management and compliance; and
- Site assessment and remediation pursuant to the Massachusetts Contingency Plan (MCP).

Table 8-1 provides a progress report of environmental compliance and management efforts in 2018 and 2019. The progress report summarizes Massport's mechanisms for implementing its environmental management goals and details where changes to these efforts occurred.

Table 8-1 **Progress Report for Environmental Compliance and Management**

Plan Elements	Progress Report for 2018 and 2019
Environmental Compliance Inspections	In 2018 and 2019, Massport performed tenant inspections at a number of its National Pollutant Discharge Elimination System (NPDES) co-permittees' (Logan Airport tenants) leaseholds and made recommendations on how to remedy issues identified during the inspections.
Environmental Management System (EMS) and International Organization for Standardization (ISO) 14001	ISO 14001 certification began for Facilities II (vehicle maintenance, landscaping, snow removal, and vehicle storage) in December 2006. In 2010, Massport expanded the Logan Airport EMS to include Facilities I (Central Heating and Cooling Plant, and heating, ventilation, and air conditioning [HVAC]) and Facilities III (electrical, structural, Central Stockroom, fuel island, and sign shop). The most recent certification audit took place in June 2019, and a certificate was issued in July 2019, which is valid through July 2020.
Tenant Technical Assistance	Massport continued publication of the *Sustainable Massport* newsletter, which informs tenants of sustainability initiatives, upcoming events, environmental compliance updates/reminders, safety tips, and best management practices (2018 and 2019 newsletters are provided in Appendix J, *Environmental Compliance and Management/Water Quality)*.
Stormwater Pollution Prevention Plan (SWPPP)	In accordance with the requirements of the current NPDES stormwater permit for Logan Airport issued on July 31, 2007, Massport and its co-permittees were required to develop SWPPPs. Massport completed its SWPPP in December 2007 with annual updates since that time. An application for permit renewal was submitted to the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) in January 2012. The permit application was determined to be administratively complete and the 2007 permit remains in effect until the renewed permit is issued. The most recent update to the SWPPP was completed in October 2019 and distributed to Massport and its stormwater co-permittees at its annual update meeting. The Logan Airport SWPPP addresses stormwater pollutants including deicing and anti-icing chemicals, bacteria, fuel and oil, and other sources of stormwater pollutants. Best management practices (BMPs) specific to aviation activities are included in the SWPPP. In accordance with the other requirements of the NPDES permit, Massport conducts training for personnel responsible for implementing activities identified in the SWPPP. The 2018 and 2019 Annual Certificates of Compliance were submitted jointly to the EPA and MassDEP in December 2018 and December 2019, respectively, by Massport and the co-permittees.

Table 8-1 Progress Report for Environmental Compliance and Management (Continued)

Plan Elements	Progress Report for 2018 and 2019
Design and Construction	Massport developed Sustainable Design Standards and Guidelines (SDSGs) for use by architects, engineers, and planners for Massport capital improvement projects in 2009.[1] The SDSGs are designed to evolve over time and foster innovation yet include clear targets to achieve more sustainable and resilient project design and practices. In addition to the SDSGs, Massport aims to construct buildings at Logan Airport to achieve U.S. Green Building Council's (USGBC's) Leadership in Energy and Environmental Design (LEED®) Silver certification or higher. Massport requires contractors to comply with the EPA Construction General Permit for all construction projects impacting one or more acres. For smaller projects, Massport requires compliance with the BMPs in the Logan Airport SWPPP. For all construction projects, Massport requires the use of ultra-low-sulfur diesel fuel in construction equipment, recycling of all construction waste to the maximum extent possible, and construction equipment retrofits with pollution control devices such as diesel oxidation catalysts and/or particulate filters.
Spill Prevention Control and Countermeasure (SPCC) Plans[2]	Massport maintains an SPCC plan for its facilities that store petroleum products. Tenants meeting certain thresholds are required to prepare their own SPCC plans for their facilities. Massport checks for SPCC plans during environmental compliance inspections. Additionally, tenants receive information on Massport BMPs, which focus on spill management and prevention.

Source: Massport.
1 More information on the SDSGs is provided in Chapter 1, *Introduction/Executive Summary*.
2 In accordance with the Clean Water Act, 40 Code of Federal Regulations 112, Oil Pollution Prevention.

International Organization for Standardization (ISO) 14001 Certified Environmental Management System (EMS)

Since 2006, Massport has had an ISO 14001 certified EMS in place, a systematic approach that Massport uses to promote continual improvement of environmental management at Logan Airport's aviation facilities. The goals of Massport's EMS are to meet regulatory requirements and to improve Massport's environmental performance beyond compliance on an ongoing basis.

The EMS consists of policies, procedures, and records that are collectively used by Massport employees to prevent pollution and address potential environmental impacts associated with Airport operations. Responding to environmental regulations and international standards, Logan Airport's EMS provides a structure for regulatory compliance and monitoring of a wide range of activities at the Airport that affect the environment, such as air quality, recycling, stormwater pollution prevention, and energy use.

Logan Airport Sustainability Management Plan (SMP)

In 2015, Massport completed the Logan Airport SMP through a grant awarded by the Federal Aviation Administration (FAA). The SMP is integrated with the existing EMS framework to promote environmental, social, and economic improvement. The completion of the SMP demonstrates Massport's leadership and commitment to a sustainable future for Logan Airport and its surrounding communities. The plan builds on Massport's rich

history of advancing sustainability and serves as a roadmap for prioritizing initiatives and moving goals forward. The SMP is intended to guide Massport's sustainability practices and supports Massport's ongoing commitment to environmental stewardship.

The SMP represents the combined efforts of over 125 employees and tenants who came together to establish Massport's baseline sustainability performance, shape goals, and identify new sustainability initiatives. Massport is focused on a holistic approach with an emphasis on economic viability, operational efficiency, natural resource conservation, and social responsibility. As part of the SMP process, Massport developed a sustainability mission statement:

> *"Massport will maintain its role as an innovative industry leader through continuous improvement in operational efficiency, facility design and construction, and environmental stewardship while engaging passengers, employees, and the community in a sustainable manner."*

Most recently, Massport published the *Massport Annual Sustainability and Resiliency Report* in 2019. The report highlights achievements and progress toward Massport's sustainability goals and targets since the release of the SMP in 2015. Massport has achieved three sustainability targets for energy use per square foot, energy use per passenger, and greenhouse gas emissions per passenger. Massport has also enhanced 100 percent of its critical assets at Logan Airport with resiliency measures.

Massport has published six consecutive *Sustainable Massport* calendars (2015 through 2020), which highlight Massport's sustainability successes. Massport's most recent *Annual Sustainability and Resiliency Reports* and *Sustainable Massport* calendars can be viewed on Massport's website at the following address: http://www.massport.com/massport/business/capital-improvements/sustainability/sustainability-management/.

Water Quality and Stormwater Management in 2018 and 2019

Massport's primary water quality goal is to prevent or minimize pollutant discharges in stormwater, thus limiting adverse water quality impacts associated with Airport activities to Boston Harbor. Massport employs a multitude of programs that promote awareness of Massport and tenant activities, which support improved surface and groundwater quality. Programs include: implementing best management practices (BMPs) for pollution prevention by Massport, its tenants, and its construction contractors; staff and tenant training; a comprehensive SWPPP; and project-specific construction SWPPPs.

The Clean Water Act of 1972 requires permits for pollutant discharges into U.S. waters from point sources and for stormwater discharges associated with industrial activities. Massport holds permits under the U.S. Environmental Protection Agency's (EPA's) and the Massachusetts Department of Environmental Protection's (MassDEP's) National Pollutant Discharge Elimination System (NPDES) Program. The individual NPDES permit covers Massport and its co-permittees at Logan Airport. It establishes effluent limitations and monitoring requirements for discharges from specified stormwater outfalls.

On July 31, 2007, EPA and MassDEP issued an individual NPDES Stormwater permit for Logan Airport (NPDES Permit MA0000787). The permit became effective on September 29, 2007, replacing the previous NPDES Permit dated March 1, 1978. The NPDES permit can be found on EPA's website at: https://www3.epa.gov/region1/npdes/logan/pdfs/finalma0000787rtc.pdf. The permit remains in effect until the new permit is issued by the EPA. Massport holds a separate NPDES permit for the Fire Training Facility (NPDES

Permit MA0032751). The following sections describe the requirements of the two permits and Massport's compliance with these requirements.

Stormwater Outfall NPDES Permit Requirements and Compliance

The following sections describe stormwater outfalls that are subject to the NPDES Permit No. MA0000787, the monitoring requirements, and the monitoring results for 2018 and 2019.

NPDES Permitted Outfalls

The NPDES permit regulates stormwater discharges from all Logan Airport outfalls including the North, West, Northwest, Porter Street, and Maverick Street Outfalls, and airfield outfalls. The acreages associated with each outfall are: North Outfall Drainage Area (152 acres); West Outfall Drainage Area (449 acres); Northwest Outfall Drainage Area (23 acres); Porter Street Outfall Drainage Area (182 acres); Maverick Street Outfall Drainage Area (34 acres); and Airfield Outfall Drainage Areas (A1 through A44), which drain the remainder of the airfield including runways, taxiways, and the perimeter roadway (910 acres). The North and West Outfall Drainage Areas also drain a portion of the airfield. These drainage areas are shown in **Figure 8-1** and further described in **Table 8-2**. The North and West Outfalls have end-of-pipe pollution control facilities to remove debris and floating oil and grease from stormwater prior to discharge into Boston Harbor.

Table 8-2 Stormwater Outfalls Subject to NPDES Permit Requirements

Outfall Name and Number	Drainage Area (Acres)	Boston Harbor Discharge Location	Major Land Uses
North (001)	152	Wood Island Bay	Terminal E, apron, taxiway, cargo areas, fuel farms, and runways
West (002)	449	Bird Island Flats	Taxiways, terminal areas, aprons, cargo areas, runways, and roadways
Porter Street (003)	182	Bird Island Flats	Hangars, vehicle maintenance facilities, cargo areas, and car rental facilities
Maverick Street (004)	34	Jeffries Cove	Car rental facilities, bus/limousine pools, and parking areas
Northwest (005)	23	Wood Island Bay	Flight kitchens and bus maintenance facility
Airfield (A1 through A44)[1]	910	Inner Harbor	Runways, taxiways, perimeter roadways, Fire Training Facility, and Massport Fire/Rescue Station 2

Source: Massport.

1 In accordance with the requirements of the NPDES permit, Massport developed an *Airfield Stormwater Outfall Sampling Plan* (March 27, 2008). The plan requires quarterly wet weather sampling at a minimum of seven of the airfield outfalls (A1 through A44) to obtain representative samples of the quality of stormwater runoff from the airfield.

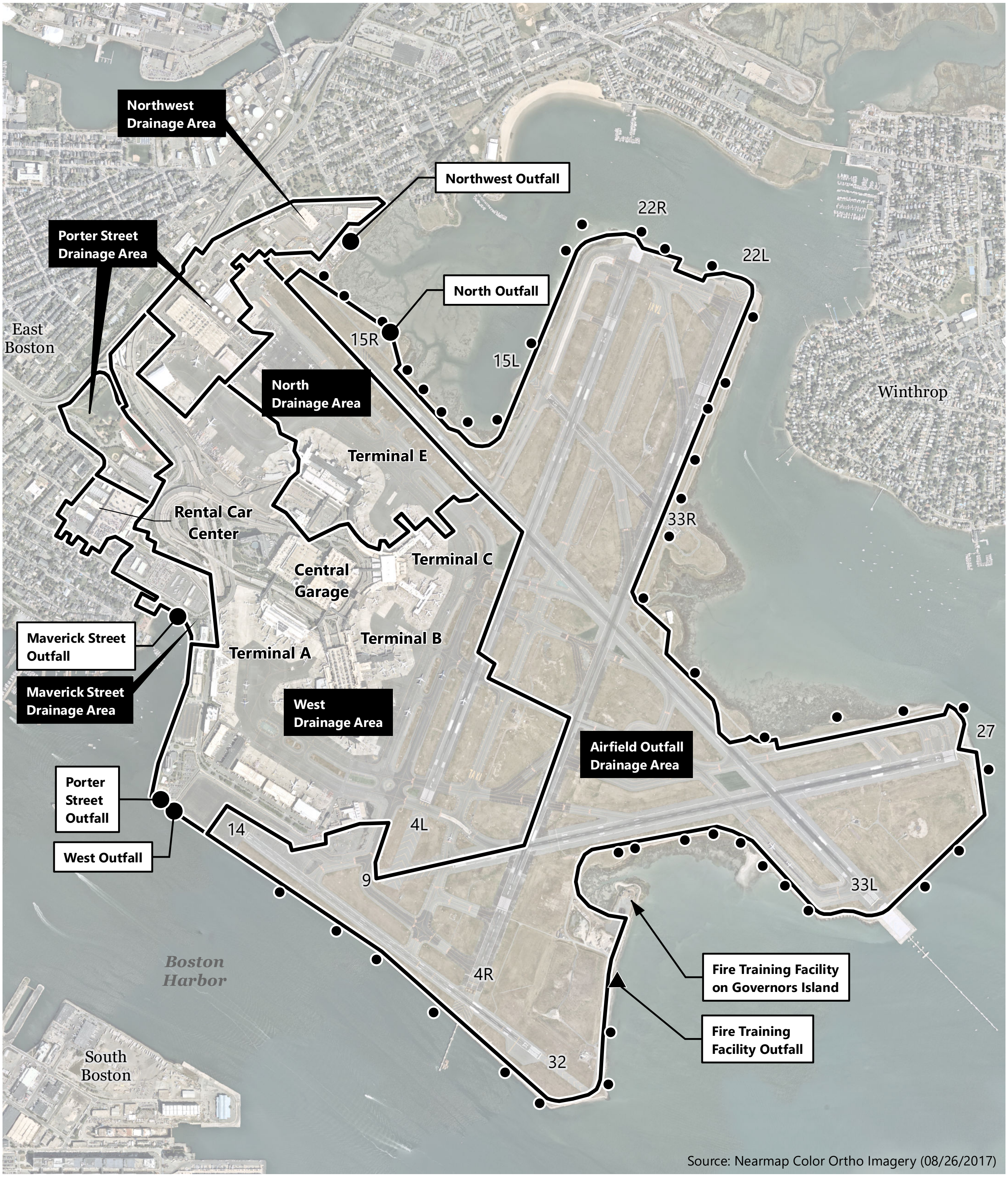


FIGURE 8-1 Logan Airport Outfalls | **2018/2019 Environmental Data Report**

▲ Fire Training Facility Outfall

● Airfield Stormwater Outfalls

▭ Drainage Area

0 500 1000 2000 Feet

Monitoring Requirements

NPDES permit (No. MA0000787) requires grab samples (single samples collected from outfall-specific locations during low tide) to be taken monthly from the North, West, Porter Street, and Maverick Street Outfalls. Samples are tested for pH, oil and grease, total suspended solids (TSS), benzene, surfactants, fecal coliform bacteria, and *Enterococcus* bacteria during both wet and dry weather. Grab samples are also taken quarterly from these four outfalls during wet weather events to analyze for eight distinct polycyclic aromatic hydrocarbons (PAHs).

Additional NPDES permit sampling requirements include sampling for deicing compounds twice per deicing season (October through April) at the North, West, and Porter Street Outfalls. The NPDES permit sets discharge limitations for pH, oil and grease, and TSS from the North, West, and Maverick Street Outfalls and for pH from the Porter Street Outfall. The NPDES permit does not include discharge limitations for the Northwest Outfall, airfield outfalls, or the deicing monitoring, and requires only that the sampling results be reported. The NPDES permit also does not set discharge limitations for bacteria, surfactants, benzene, or PAHs for any of the outfalls; sampling results for these parameters require reporting only. Appendix J, *Environmental Compliance and Management/Water Quality,* contains additional information on the sampling requirements of the NPDES permits.

Monitoring Results

In 2018, 97 percent of stormwater samples were in compliance with standards for pH, oil and grease, and TSS. In 2019, 99 percent of stormwater samples were in compliance with standards for pH, oil and grease, and TSS. Refer to **Table J-27** in Appendix J, *Environmental Compliance and Management/Water Quality,* for more details. Due to the large size of the drainage areas and relatively low concentration of pollutants, it is not always possible to trace exceedances to specific events. Where a known event such as a spill is reported, Massport checks the drainage system for impacts from the event and undertakes all requisite corrective actions.

The NPDES water quality monitoring results are posted on Massport's website (http://www.massport.com/massport/business/capital-improvements/sustainability/water-quality/). Massport provides copies of the monitoring results to EPA and MassDEP. The 2018 and 2019 water quality monitoring results for discharge from the outfalls are provided in Appendix J, *Environmental Compliance and Management/Water Quality,* along with the history of water quality monitoring results dating back to 1993.

Deicing Monitoring

Deicing is typically conducted at Logan Airport from October or November through March or April. Deicer use is subject to the 2007 NPDES permit, which requires Massport and each airline and/or fixed base operator conducting deicing at Logan Airport to develop tailored plans to reduce deicer use. Massport and its co-permittees conducted a Deicing Management Feasibility Study to evaluate various technologies to reduce aircraft deicing fluid discharges to Boston Harbor. Massport submitted the results of the Deicing Management Feasibility Study to the EPA in May 2017.

Deicing sampling at the North, West, Porter Street, and airfield outfalls occurred during wet weather on January 17, 2018, March 22, 2018, and February 12, 21, and 28, 2019. Sampling results are reported as required to the EPA and MassDEP and listed in Appendix J, *Environmental Compliance and Management/Water Quality* (see **Tables J-13, J-14, J-25,** and **J-26** for deicing monitoring results).[2]

Stormwater and Sanitary Sewer System Inspections and Repairs

Between 2006 and 2008, Massport conducted inspections of the sanitary sewer and stormwater drainage system serving Logan Airport to document the condition of the systems and identify potential impacts from the sewer to the stormwater drainage system. Such impacts could result from leaks or breaks from the sanitary sewer or from direct, inadvertent, illegal cross-connections to the stormwater drainage system. As a result of these surveys, the Boston Water and Sewer Commission (BWSC) and Massport completed replacement of sections of the sanitary sewer system as detailed in previous environmental documents.

Massport's Facilities Department continues its inspection and cleaning of manhole and catch basin structures at locations throughout the Airport. The drainage system maintenance program also includes inspection and cleaning of Stormceptor water quality control structures. In accordance with Part I.B.10.h. of the Logan Airport NPDES Permit, the inspection and cleaning activities focus on manhole and catch basin structures within 100 yards of aircraft, vehicle, and equipment maintenance facilities.

Drainage structures, including catch basins and manholes, were inspected and cleaned as needed. A total of 59 Stormceptor units were inspected, and cleaned as needed, two times per year in 2018 and 2019, during the spring and fall months. The maximum depth of sediment measured in the units was 24 inches which was measured in one unit in October 2018, and there were three units found to have a sediment depth of 18 inches in October 2019. These were the only units having a sediment depth that required cleaning; however, all units having a sediment depth of 10 inches or more (13 units) were cleaned during these two time periods. During April 2018, there were five Stormceptor units found to contain sediment depths between 10 and 14 inches, and there were two units found to contain 10 inches of sediment in May 2019. A total of 15 units were found to contain sediment depths of 6 inches or more during the spring time periods and all sediment was removed from these units. Less than 5 cubic yards of sediment was removed from the units during any of the spring and fall time periods. The removed sediment was transported offsite to a solid waste landfill.

2018 and 2019 Bacteria Source Tracking

Massport continues to monitor bacteria levels at stormwater outfalls by obtaining samples during wet weather and dry weather events. Review of the laboratory analytical data indicates that bacteria levels continue to be highly variable, with no consistent trends that would indicate an ongoing source such as a cross-connection to a sanitary sewer line. Sampling results are available in Appendix J, *Environmental Compliance and Management/Water Quality*.

2 Wet weather deicing monitoring was only required during the first and third year of the NPDES permit.

Fire Training Facility NPDES Permit Requirements and Compliance

NPDES Permit No. MA0032751 regulates treated wastewater surface water discharges to Boston Harbor from the Fire Training Facility on Governor's Island (**Figure 8-1**).[3] This Permit is effective on the signature date (August 15, 2014) and expired on July 31, 2019. The permit was administratively continued pending issuance of the new permit. The treated wastewater from fire training exercises is stored, treated by separation and a carbon filter to remove fuel contaminants, and is typically reused onsite to recharge the fire training pit for training exercises. If no storage is available, treated wastewater is tested prior to discharge to the storm sewer to ensure compliance with the Fire Training Facility's NPDES Permit. Discharge monitoring reports are submitted monthly to the EPA.

In 2018, Massport discharged treated wastewater to Boston Harbor on five distinct days; December 4, 7, 13, 18, and 26. The total gallons of treated wastewater discharged for each event were 19,360; 19,330; 18,400; 19,360; and 19,330 at a discharge rate of 80 gallons per minute (gpm). A composite sample was collected from each batch of treated wastewater and compliance with permit limits were confirmed before each batch of treated wastewater was discharged to Boston Harbor. Pursuant to permit requirements, the annual Whole Effluent Toxicity (WET) testing was performed during the discharge event on December 4, 2018. The WET test indicated that the full-strength effluent would not have an adverse effect on aquatic life.

In 2019, Massport discharged treated wastewater to Boston Harbor on two separate days; November 13 and 18. The total gallons of treated wastewater discharged for each event were 19,752 gallons at 80 gpm and 18,530 gallons at 64 gpm, respectively. The annual WET test performed on November 13, 2019 indicated that the full-strength effluent would not have an adverse effect on aquatic life.

Fuel Use and Spills in 2018 and 2019

Management of fueling operations at Logan Airport is designed to minimize impacts on water quality by implementing SWPPP BMPs, including the use of reliable storage, secondary containment, and effective spill cleanup procedures. Massport's jet fuel storage and distribution infrastructure, installed in 2000 and 2001, includes a zoned leak detection system for underground fuel piping, which identifies volumetric changes of product in the pipe at operating pressure and zero pressure. The system combined the storage facility with a hydrant fuel system that reduced the need for trucks and dispensing.

The fuel storage and distribution system was designed to ensure the reliable detection of leaks to the extent technologically feasible. The consolidated above ground jet fuel storage facility and distribution system are leased and operated by BOSFuel Corporation, an airline consortium. The management of the facility by one entity was put in place to minimize potential fuel spills and maximize water quality protection for the storage and distribution facilities. Cathodic protection, leak detection, secondary containment, and tank overfill protection methods such as alarms, inventory-gauging sensors in the tanks, and emergency fuel shut-off systems have been installed. Built-in environmental controls, unified operations, and the ongoing contingency planning provide heightened environmental protection and more efficient fuel handling operations.

3 NPDES Permit No. MA0032751 - Logan International Airport Fire Training Facility. Issued August 15, 2014.

Massport Fire Rescue maintains records of all spills at Logan Airport (see **Table 8-3**). State environmental regulations require that oil spills of 10 gallons or more in volume be reported to MassDEP. Spills that enter storm drains of any volume must also be reported to MassDEP. Massport maintains records of all spills, including those less than the reporting threshold. In 2018, of the oil and hazardous material spills reported to Massport Fire Rescue, eight spills (4.2 percent) were reportable to MassDEP due to their volume. Of the eight reportable spills in 2018, 38 percent of the spills were from commercial airlines, 25 percent from aircraft fueling, 25 percent construction contractors, and 12 percent trucking. By volume, jet fuel spills accounted for 96 percent of total fuel spilled; diesel/hydraulic fuel accounted for 2.9 percent; and other fuels accounted for approximately 1 percent. During 2018, six fuel spills impacted a storm drain. The storm drains were subsequently remediated of the fuel.

In 2019, there were 22 reportable spills. Nine of the 22 spills impacted a storm drain. Forty-five percent of the reportable fuel spills were from commercial airlines, 32 percent from aircraft fueling; 14 percent from general aviation; 5 percent from construction, and 5 percent from car rental.

By volume of spill, 64 percent comprised of jet fuel; 26 percent diesel/hydraulic fuel; 5 percent gasoline, and the remaining 5 percent comprised of other fluids such as avgas; transmission fluid and motor oil.

A summary of Logan Airport jet fuel usage and spill records from 1990 to 2019, as well as details pertaining to type and quantity of the spills, can be found in Appendix J, *Environmental Compliance and Management/Water Quality* **Tables J-28** and **J-29**.

Table 8-3 Logan Airport Oil and Hazardous Material Spills and Jet Fuel Handling[1]

Year	Total Number of all Spills	Total Number of all Spills ≥10 gallons	Total Volume of all Spills (Gallons)	Estimated Volume of Jet Fuel Handled (Gallons)	Total Volume of Jet Fuel Spilled (Gallons)
2010	87	15	476	335,693,997	360
2011	108	12	572	340,421,373	337
2012	132	5	593	343,731,127	439
2013	94	6	452	349,397,940	351
2014	129	17	2,785	370,222,342	785
2015	196	16	1,278	374,985,216	885
2016	231	14	1,158	456,003,328	558
2017	176	8	2,310[2]	472,229,047	315
2018	189	8	7,660[3]	521,056,895	7,383
2019	152	22	799	542,314,657	514

Source: Massport Fire Rescue and Massport Environmental Management.
1 Material spills include: jet fuel, hydraulic oil, diesel fuel, gasoline, and other materials such as glycol and paint.
2 1,750 gallons of deicing fluid spill in January 2017.
3 7,000 gallons of jet fuel (estimated) was released during construction on a fuel hydrant distribution line.

Tank Management Program

In 2016, Massport and its tenant tank owners complied with new state storage tank regulations as prescribed by 310 CMR 80.00 administered through the MassDEP Underground Storage Tank (UST) Program.[4] These new regulations transferred jurisdiction of all USTs from the Massachusetts Department of Fire Services (DFS) to MassDEP. Jurisdiction of all aboveground storage tanks (ASTs) with capacity volumes greater than 10,000 gallons remained with the DFS, and those ASTs with less than a 10,000-gallon capacity are now under local Massport Fire Department jurisdiction. There are three ASTs at Logan Airport with volumes greater than 10,000 gallons. Two of these tanks are located in the North Service Area and contain potassium acetate runway deicing fluid. The third tank is located at the Central Heating Plant and is used for the storage of heating oil. As a BMP, Massport continues to monitor tank systems, upgrade facilities, and remove tanks as needed. Compliance with the new tank regulations included:

- Re-permitting all ASTs using a newly created Massport Fire Department tank permit;[5] and
- Updating and tracking AST permit status, using the Massport AST database.

Massport implements a tank management program that includes:

- A continuing program of monthly inspections, testing, and minor repairs of all Massport-owned tanks, related piping, tank monitoring systems, and related equipment.
- Annual Stage I Vapor Recovery testing, which was conducted in 2017 for Massport's gasoline USTs and piping systems at the Airport. Massport personnel were trained on the proper operation and inspection of the Stage I systems. Stage I vapor recovery involves the recovery of vapors from the gasoline tank by the tanker truck when deliveries occur. Stage I systems will continue to be operated, maintained, and tested on an annual basis.
- Annual DFS inspections of Massport's ASTs greater than 10,000 gallons in volume, and submittal of the inspection documentation to DFS.
- Review of all proposed tenant tank upgrades, installations, and tank removals (under Massport's Tenant Alteration Application (TAA) process[6]) to ensure compliance with applicable state and federal regulations and with Massport policy.
- Ongoing upgrade and maintenance of a database that contains information on all USTs located on Massport property. For each tank, the database tracks location, permit status, third party inspection status, compliance status with applicable tank regulations, and tank and monitoring system equipment summaries. Information on ASTs is kept in a separate database developed in 2010.

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4 310 Code of Massachusetts Regulations 80.00.

5 Although aboveground storage tanks (ASTs) with a capacity of less than 10,000 gallons are no longer under the jurisdiction of the Massachusetts Department of Fire Services, the tanks are still subject to the Massachusetts fire regulations. The ASTs with a capacity of less than 10,000 gallons are now under the jurisdiction of the Massport Fire Rescue. Each tank requires a permit from the Massport Fire Rescue, which does not expire unless the tank is moved to a different location. ASTs with capacity of over 10,000 gallons are required to obtain both a permit from Massport Fire Rescue and the required permit from the Massachusetts Department of Fire Services.

6 The Tenant Alteration Application is an internal Massport process for tenants who want to make modifications to their leasehold.

- Information provided to tenants regarding the revised storage tank regulatory requirements and assistance with tenants' tank permitting procedures.

Site Assessment and Remediation

Massport complies with the MCP by monitoring fuel and oil and hazardous materials spills and tracking the status of spill response actions. The MCP (310 Code of Massachusetts Regulations 40 et seq.) lays out a set of regulations that govern the reporting, assessment, and cleanup of spills of oil and hazardous materials in Massachusetts. The MCP, which is administered by MassDEP, prescribes the site cleanup process based on the nature and extent of a release's contamination. The MCP defines the roles for those parties affected by and potentially responsible for the release and establishes the release reporting program and submission deadlines for tracking events from initial release to regulatory closure.

In accordance with the MCP, Massport assesses, remediates, and brings to regulatory closure areas of subsurface contamination. There are several phases of investigation for contaminated sites. Phase I involves initial site investigations for the presence of contamination and Phase II comprehensive site investigations include site-focused risk assessments. Phase III identifies, evaluates, and selects remediation actions and Phase IV involves the implementation of selected remedial actions. Phase V involves the operation, maintenance, and/or monitoring of the remediation program. Massport undertakes the performance of a variety of response actions, including remediation at sites where Massport is the responsible party, where there are multiple responsible parties, and where no responsible party has been identified. **Table 8-4** describes Massport's progress in 2018 and 2019 in achieving regulatory closure of the MCP sites identified in **Figure 8-2**. Detailed information for sites that have achieved regulatory closure can be found in **Table J-30** in Appendix J, *Environmental Compliance and Management/Water Quality*.

FIGURE 8-2 **Massachusetts Contingency Plan Sites (Active)**

2018/2019 Environmental Data Report

1. Fuel Distribution System (3-1287)
2. Fire Training Facility (3-28199)
3. Former American Airlines - North Cargo (3-35030)
4.Terminal B Gate 5 (Formerly Gate 7) (3-35047)
5. Terminal B Gate 29 (3-35608) (Closed May 2020)

Table 8-4 Status of Massachusetts Contingency Plan (MCP) Active Sites at Logan Airport

Location (RTN) and MassDEP Reporting Status	Action/Status
1. Fuel Distribution System (FDS) RTN: 3-1287 - OPEN	
2011	A Periodic Review of the Temporary Solution for the FDS was submitted in April 2011. Three Post-Class C Response Action Outcome (RAO) Status Reports were submitted for the FDS in February, June, and December 2011, summarizing the routine inspection and monitoring activities.
2012	Post-Class C RAO Status Reports were submitted in May and November 2012, summarizing the routine inspection and monitoring activities.
2013	Post-Class C RAO Status Reports were submitted in May and November 2013, summarizing the routine inspection and monitoring activities.
2014	Post-Class C RAO Status Reports were submitted in May and November 2014, summarizing the routine inspection and monitoring activities. In addition, a Release Abatement Measure (RAM) Plan was submitted in April 2014 to address construction in the area of the FDS followed by a RAM Completion Report submitted in August 2014.
2015	Post-Temporary Solution Status Reports were submitted in May and November 2015, summarizing the routine inspection and monitoring activities.
2016	RAO-C 5-year periodic review submitted in July 2016. Two Post-Temporary Solution Status Reports were submitted in 2016 summarizing the routine inspection, monitoring, and product recovery activities.
2017	Tier II Extension transmitted in August 2017 for response actions conducted at Terminal B subsequent to filing a Temporary Solution. A Final Permanent Solution Statement was submitted for Areas 3 and 5 in December 2017.
2018	A Post-temporary Solution Status Report submitted in February, 2018; a RAM Plan submitted for Terminal C in February 2018; RAO-C Inspection Report Submitted March, 2018; a RAM Plan Modification #2 submitted for Terminal B; a RAM Status Report submitted for Terminal C; Final RAM Status Report submitted in July, 2018; Post temporary Solution Status Report submitted in July, 2018; and a RAM Plan Modification #1 for Terminal C submitted in December, 2018.
2019	A Post-temporary Solution Status Report submitted in January, 2019; Terminal B RAM Status Report submitted in January, 2019; a RAM Completion Report submitted for Terminal B Pier B in August, 2019; a Terminal C Pier B RAM Completion Report submitted in September, 2019; and a RAM Plan for the Terminal B-C Connector Project was submitted in November, 2019.
2. Fire Training Facility RTN: 3-28199 – OPEN	
2011	A RAM Completion Statement was submitted on April 25, 2011. A Phase II Scope of Work was prepared and submitted to MassDEP on January 18, 2011. Phase II and Phase III Reports were submitted on December 8, 2011. A RAM Completion Statement was submitted on April 25, 2011.
2012	Phase IV Status Report transmitted in June 2012; the Phase IV Remedy Implementation Plan was submitted in December 2012.
2013	Phase IV Status Report transmitted in June 2013, the Phase IV Completion Report was transmitted in December 2013.
2014	Phase V Remedy Operation Status Reports submitted in June and December 2014.

Table 8-4	Status of Massachusetts Contingency Plan (MCP) Active Sites at Logan Airport (Continued)
Location (RTN) and MassDEP Reporting Status	**Action/Status**
2. Fire Training Facility RTN: 3-28199 – OPEN (Continued)	
2015	Phase V Remedy Operation Status Reports submitted in June and December 2015.
2016	Phase V Remedy Operation Status Reports submitted in June and December 2016.
2017	Phase V Remedy Operation Status Reports submitted in June and December 2017.
2018	Phase V Remedy Operation Status Reports submitted in June and December 2018.
2019	Phase V Remedy Operation Status Reports submitted in June and December 2019.
3. Former American Airlines – North Cargo RTN: 3-35030 - OPEN	
2018	Release Notification made on June 29, 2018 due to presence of Non-Aqueous Petroleum Liquid in a monitoring well at a thickness not consistent with the previously submitted Response Action Outcome. Immediate Response Action (IRA) Plan submitted in August 2018; IRA Status Report submitted December 2018.
2019	Phase I and Tier Classification submitted in July 2019 A RAM Plan submitted in August 2019; a RAM Plan Status Report No. 1 was submitted in December 2019. Construction is ongoing with the Terminal E Modernization Project and subsequent reports will be filed.
4. Terminal B Gate 5 (formerly Gate 7) RTN: 3-35047 - OPEN	
2018	Release Notification in July 2018 regarding a release of jet fuel from a hydrant line during the Terminal B Optimization construction project; an IRA Plan was submitted in September 2018; and an IRA Status Report was submitted in November 2018;
2019	A final IRA Status Report was submitted in May 2019; a Phase I, Tier Classification and a Conceptual Phase II Scope of Work were submitted in July 2019, and an IRA Completion Report was submitted in November 2019.
5. Terminal B Gate 29 RTN: 3-35608 – CLOSED (May 2020)	
2019	Release Notification in May 2019 due to elevated vapors during removal of an underground storage tank; IRA Plan submitted in July 2019; IRA Status Report submitted in September 2019. A Permanent Solution Statement was submitted in May 2020 so the site is now closed.

Source: Massport.

Notes: RTN = Release Tracking Number. This list includes active Massport MCP sites only. Additional sites are the responsibility of Logan Airport tenants. Refer to **Figure 8-2** for location of active MCP sites. Complete information dating back to 1997 on closed sites is included in Appendix J, *Environmental Compliance and Management/Water Quality*.

Phase I Initial Site Investigation
Phase II Comprehensive Site Assessment
Phase III Identification, Evaluation, and Selection of Comprehensive Remedial Actions
Phase IV Implementation of Selected Remediation Action
Phase V Operation, Maintenance, and/or Monitoring

9

Environmentally Beneficial Measures and Project Mitigation Tracking

This *2018/2019 Environmental Data Report (EDR)* focuses primarily on calendar years 2018 and 2019, however, due to the dramatic effects of the COVID-19 pandemic in 2020, Massport has strived to include relevant updates through fall 2020. Beginning in March 2020, flights in and out of Boston Logan International Airport (Logan Airport or the Airport) were dramatically reduced and passenger levels dropped by over 90 percent at the peak of the pandemic in the spring and summer of 2020. As a result, there are far fewer aircraft operations and passengers and a dramatic drop in overall Logan Airport activity. While activity levels began a slow recovery in mid-summer 2020, the ongoing wave of COVID-19 cases has resulted in continued historically low levels of activity, with a full recovery years away. As of October 2020, total flight operations for the year were down by 50 percent and passenger levels were down by about 70 percent compared to January through October 2019. Massport expects that by the end of 2020, passenger levels will have dropped to levels of activity not seen since the mid-1970s.

As a result of this significant reduction in Airport activity and dramatic reduction in revenues, Massport, airlines, and other tenants have adjusted their operations, including ground access services to reflect current activity levels. Concurrently, the schedule for a number of Airport projects and programs have been adjusted. To be as transparent as possible, this chapter includes the most current projects and programs update through October 2020. As a result of the pandemic and the unprecedented reduction in passengers and revenues, many Massport and tenant projects have been deferred. Massport is continuing to review the status of its projects, programs, and ground access strategies and additional changes or deferments could occur. Forthcoming EDRs will continue to provide updates, as available.

Introduction

This chapter of the *2018/2019 EDR* summarizes Massport's environmentally beneficial measures associated with Logan Airport. While many measures are applied on an individual project basis, Massport also implements a wide range of ongoing measures both to enhance operational efficiency and reduce overall environmental impacts.

EDRs and Environmental Status and Planning Reports (ESPRs) also provide updates on Massport's formal mitigation commitments under the Massachusetts Environmental Policy Act (MEPA) for projects at Logan Airport

for which an Environmental Impact Report (EIR) was filed and state Section 61[1] Findings were committed in order to document that all feasible measures have been taken to avoid or minimize impacts.

The first part of this chapter provides an overview of Massport's programs and initiatives that reduce operational and environmental impacts and associated environmental benefits. The second part provides updates for specific projects with ongoing or upcoming Section 61 mitigation commitments, as documented in **Tables 9-1** through **9-8**. Projects for which mitigation has been completed are not reported in EDRs and ESPRs. Once projects with ongoing requirements are constructed, mitigation tracking reports only on the continuing requirements. Each project discussed below completed state and federal environmental review and adopted a mitigation plan that has been formalized with individual Section 61 Findings. Massport tracks both Massport and Logan Airport tenants' progress toward implementing and meeting their environmental mitigation commitments on schedule and in accordance with the requirements set out in the Section 61 Findings for each project. As each project moves forward through its design and construction phases, its mitigation plan is implemented with ongoing tracking to ensure compliance.

Environmentally Beneficial Measures

Massport is committed to minimizing the effects of Airport operations on the community and environment by implementing a robust set of Airport-wide initiatives for the benefit of the traveling public, Airport users, employees, and neighbors. These include the following environmentally beneficial measures:

- **High Occupancy Vehicle (HOV) Strategy.** Massport has a comprehensive, multi-pronged strategy to diversify and enhance ground transportation options for Logan Airport passengers and employees. The ground transportation strategy is designed to maximize the use and capacity of HOV, transit, and shared-ride options that are convenient and reliable, and that reduce environmental and community impacts. Massport continues to promote and support HOV and shared-ride services to improve operations along terminal-area roadways and at curbside areas, alleviate constraints on parking, improve customer service, and minimize emissions.

  Massport regularly evaluates and updates its strategies to improve and expand Logan Airport ground access services with a strong focus on HOV service modes. Central to this strategy is continued investment in Logan Express facilities and service. Given the recent increase of the RideApp companies (formerly transportation network companies or TNCs) such as Uber and Lyft now servicing Logan Airport, in 2019, Massport established a goal to double Logan Express ridership from 2 million to 4 million passengers, thereby reducing vehicle miles traveled (VMT), congestion, and air quality emissions. In 2019, Massport began a series of new Logan Express services focusing on the Braintree, Framingham, and Back Bay locations. Massport also began evaluating new Logan Express locations, advancing plans to add nearly 1,000 additional spaces to the Framingham garage and the exploring the possibility of adding structured parking at the Braintree site to enhance capacity. To build ridership for the Back Bay route, in May 2019, Massport initiated reduced fares at the Back Bay site, and provided free service from Logan Airport to Back Bay. Massport has also committed to purchase eight additional Silver Line buses, increasing the fleet size to 16 buses serving Logan Airport, once passenger levels return. Similar to the current operation, the Massachusetts Bay Transportation Authority (MBTA) would operate

1 Massachusetts General Law, Chapter 30, Section 61 (M.G.L. c. 30, § 61).

the additional buses. Massport plans to purchase eight MBTA Silver Line buses as part of a forthcoming MBTA procurement. More information can be found in Chapter 5, *Ground Access to and from Logan Airport*.

- **RideApp Management.** As services like Lyft and Uber have become an increasingly popular option for travelers getting to and from Logan Airport, Massport has and will continue to develop strategies to facilitate efficient operation of all modes of ground transportation. In an effort to reduce congestion and emissions, Massport has implemented a robust plan to manage RideApp operations and reduce RideApp deadhead activity – those trips that don't include a rider. In 2019, Massport's constructed new curb areas within the Central Garage specifically to handle RideApp operations. There are two key goals of these new areas: (1) reduce terminal curb congestion, and (2) enhance rematch[2] and shared ride programs. The RideApp fee structure was also adjusted to encourage shared rides and competition between modes, and optimization of RideApp operations on-Airport. For more detailed information on Massport's RideApp management plan, please see Chapter 5, *Ground Access to and from Logan Airport*.

- **Long-Term Parking Management Plan.** Logan Airport's parking supply, pricing, and operations are managed to promote the use of HOV, transit, and shared-ride options and to reduce drop-off/pick-up modes, which generate up to four vehicle trips instead of two.[3] The modified Logan Airport Parking Freeze approved by the Massachusetts Department of Environmental Protection (MassDEP) and the U.S. Environmental Protection Agency (EPA) is one element of Massport's ground access strategy to reduced drop-off/pick-up modes. The modification allows for an additional 5,000 commercial parking spaces at Logan Airport. Consistent with this change, Massport has been advancing plans for constructing 2,000 spaces in a new garage in front of Terminal E. The remaining 3,000 spaces are being planned as a future expansion of the Economy Garage. However, due to the COVID-19 pandemic and significant reduction in passenger activity levels, Massport has deferred this project.

  Massport has taken steps to advance three key Logan Airport ground access studies, known as the Logan Airport Parking Freeze Amendment, Ground Access, and Trip Reduction Strategy Studies. These reports were completed in September 2019 and analyze the feasibility and effectiveness of the following:

  - Potential services and improvements to HOV access;
  - Potential operational measures to further reduce drop-off/pick-up modes; and
  - Possible pricing strategies for different modes.

  As noted above, beginning in March 2020 in response to the COVID-19 crisis, passengers and employees significantly adjusted their travel patterns to temporarily rely much more heavily on single occupancy modes which promote social distancing. The *2020 EDR* will provide an update on those changes and evolving implementation of ground access strategies.

2 Rematch allows drivers who are dropping off to instantly pick up another passenger without needing to circle the Airport or leave empty.

3 Drop-off/pick-up modes can include private vehicles, taxis, RideApp, and black car limousine services. For example, if an air passenger is dropped off when departing on an air trip and is picked up upon return, that single air passenger generates a total of four ground access trips: two for the drop-off trip (one inbound to Logan Airport, one outbound from Logan Airport) and two for the pick-up trip (one inbound to Logan Airport, one outbound from Logan Airport). The air passenger may be dropped off and picked up in a private vehicle or in a taxi, RideApps, or a black car limousine that may not carry a passenger during all segments of travel to and from Logan Airport.

These studies are available on the Massport website at http://www.massport.com/media/3370/final-massport-dep-report.pdf.

- **Noise Abatement and Sound Insulation.** Massport's comprehensive noise abatement program includes a dedicated Noise Abatement Office; a state-of-the-art Noise and Operations Monitoring System (NOMS); extensive residential and school sound insulation programs for those eligible under federal guidelines; time of day and runway restrictions for noisier aircraft; ground run-up procedures; and flight tracks designed to optimize over-water operations (especially during nighttime hours). Massport continues to be a national leader in sound insulation mitigation. To date, Massport has provided sound insulation for a total of 36 eligible schools and 11,515 residential units, with an investment of over $170 million, and will continue to seek funding for mitigation for properties that are eligible and whose owners have chosen to participate.

  Massport continues to engage with the Federal Aviation Administration (FAA) regarding homes that may be eligible for mitigation from noise levels greater than or equal to a day-night average sound level (DNL) 65 decibels (dB). As of 2015, the FAA requires airports to use the Aviation Environmental Design Tool (AEDT) model to establish eligibility for sound insulation; therefore, in 2019, Massport updated its Residential Sound Insulation Program (RSIP) Noise Exposure Map contours and submitted an AEDT-derived noise exposure map to FAA in 2020 for review and discussion. The FAA requires that a submitted sound insulation program contour should represent current operational conditions; generally, the contour year should match the date of the document submittal. However, due to the significant decrease in 2020 operations caused by the COVID-19 pandemic, Massport developed a 2019 RSIP forecast contour including block rounding representing pre-COVID conditions to comply with this requirement and submitted it to FAA in the summer of 2020. Once accepted by the FAA, Massport will reach out to eligible homeowners to discuss potential mitigation options for their homes, subject to federal and Massport funding availability.

  In January 2020, Massport's CEO sent a letter to the FAA Associate Administrator requesting that Massport and the FAA work together to address re-treatment of homes that were sound insulated during the early years of the program to upgrade eligible homes to newer more effective and durable materials. The Associate Administrator responded that the FAA is exploring limited circumstance under which Massport might be able to mitigate homes that had been mitigated before the FAA first issued sound insulation standards in 1993. The status of the initiative will be reported in future EDRs. See Appendix H, *Noise Abatement,* for more information.

  These efforts and progress towards achieving noise reduction goals, can be found in Chapter 6, *Noise Abatement*.

  - Massport and FAA continue to work with the Massachusetts Institute of Technology (MIT) to identify opportunities to reduce noise through changes to performance-based navigation (PBN), including area navigation (RNAV). This is a first-in-the-nation project between the FAA and an airport operator to better understand the implications of PBN and evaluate strategies to address community concerns.
  - Massport is working with the Aviation Sustainability Center (ASCENT) on two research projects concerning aircraft noise and flight procedures.

- **Air Emissions Reduction**. Massport is a national leader in studying, tracking, and reporting on the air quality environment of Logan Airport, and implementing measures to reduce emissions. Initiatives

include operating one of the largest privately operated, publicly accessible, compressed natural gas (CNG) stations in New England; providing pre-conditioned air (PCA) and 400 Hertz (Hz) power at all aircraft contact gates to reduce aircraft idling; and a commitment to sustainable design. More information can be found in Chapter 7, *Air Quality/Emissions Reduction*.

- **Electric Ground Service Equipment (eGSE).** As part of the ongoing Alternative Fuel Program, Massport is facilitating the replacement of gas- and diesel-powered ground service equipment (GSE) with all-electric GSE (eGSE) by the end of 2027, as commercially available. Massport has been awarded grants to facilitate this initiative, including:
  - The EPA awarded a grant in 2018 to Massport under the Diesel Emission Reduction Act (DERA) to replace gas- and diesel-powered GSE at Logan Airport in a collaborative effort to reduce emissions and improve air quality. American Airlines will contribute the entire match and Massport will provide support in the way of grant administration and data tracking. This grant will allow Massport to replace 25 pieces of diesel-powered GSE with all-electric versions. This grant will be used in conjunction with a FAA grant Massport received in the fall of 2018 to install eGSE charging stations for the Terminal B Optimization Project (see below).
  - In 2018, Massport was awarded a grant through FAA's Voluntary Airport Low Emission Program (VALE) for American Airlines' charging infrastructure at Terminal B to install 50 eGSE charging stations. In 2019, through the same program, Massport was awarded a grant for jetBlue Airways' charging infrastructure at Terminal C, Massport contributed toward the installation of 42 eGSE charging stations.
  - Additionally, in 2019 Massport was awarded by EPA under DERA a grant to replace 44 diesel-powered GSE equipment with all-electric baggage tractors, belt loaders, and push back tugs. GSE owners at Logan Airport will contribute a match.
  - In 2019, Massport was awarded through MassDEP's Volkswagen Diesel Settlements & Environmental Mitigation Open Solicitation grant program, aimed at reducing nitrogen oxide (NO_X) and greenhouse gas (GHG) emissions, a grant to acquire eGSE in partnership with jetBlue Airways, this will replace 31 pieces of GSE with new eGSE and install four eGSE charging stations at Terminal C. United Airlines also privately pursed this grant and was awarded funds.

  More information can be found in Chapter 7, *Air Quality/Emissions Reduction*.

- **Alternative Fuel Vehicles (AFV) Program.** The AFV Program is designed to replace Massport's conventionally fueled fleet with alternatively fueled or powered vehicles, when feasible, to help reduce emissions associated with Logan Airport operations. Massport now operates 103 vehicles powered by CNG, propane, E85 flex fuel, diesel/electric hybrid, gasoline/electric hybrid, and plug-in electric. Massport also established a vehicle procurement policy in 2006 that requires consideration of AFVs when purchases are made. For example, beginning in 2013, as part of the Southwest Service Area (SWSA) redevelopment, the existing fleet of diesel rental car shuttle buses was replaced by CNG or clean diesel-electric hybrid buses. In 2017, two CNG Honda Civics were retired, and the remaining seven were retired in 2019 and replaced with seven plug-in electric hybrid vehicles. The remaining CNG pick-up trucks and vans were retired in 2018. More information can be found in Chapter 7, *Air Quality/Emissions Reduction*.

- **Open Space/Buffer Program.** Massport has invested in an extensive open space program intended to enhance the surrounding communities. Massport initially committed over $15 million for the planning, construction, and maintenance of four Airport edge buffer areas and two parks along Logan Airport's perimeter. These buffers include the Bayswater Embankment Airport Edge Buffer, Navy Fuel Pier Airport Edge Buffer, Neptune Road Airport Edge Buffer, and the SWSA Airport Edge Buffer (Phases I and II). The award-winning Piers Park was completed in 1995 and has since become part of a network of greenspace that traverses East Boston from the Jeffries Point waterfront to Constitution Beach. In 2014, Massport completed construction of the East Boston Greenway Extension that connects Bremen Street Park to Wood Island Marsh. In 2016, Massport assumed operations of the City's Greenway extension to Constitution Beach. In October 2019, the East Boston Greenway was renamed Mary Ellen Welch Greenway, a long-time East Boston community activist.

  Adjacent to the current Piers Park, Piers Park Phase II will add approximately 4.2 acres of green space to the East Boston waterfront upon completion. Studies are underway by the Trustees of Reservations for a proposed Piers Park Phase III, which would transform the deteriorating pier into a 3.6-acre public greenspace including resiliency features to help protect the East Boston neighborhood from flooding and sea level rise. Massport issued a Request for Proposals in February 2018 for design and construction of Piers Park Phase III. In 2020, The Trustees of Reservations were selected to advance planning and permitting for this facility. Initial site feasibility studies are underway.

  Today, East Boston enjoys 3.3 miles and more than 33 acres of green space developed or managed by Massport, in partnership with and in response to engagement with the East Boston community. More information can be found in Chapter 3, *Airport Planning*.

- **International Organization for Standardization (ISO) 14001 Certified Environmental Management System (EMS)**. Since 2006, Massport has had an ISO 14001 certified EMS in place, a systematic approach that Massport uses to promote continual improvement of environmental management at Logan Airport's Aviation Facilities. The goals of Massport's EMS are to meet regulatory requirements and improve Massport's environmental performance beyond compliance on an ongoing basis. The EMS consists of policies, procedures, and records that are collectively used by Massport employees to prevent pollution and address potential environmental impacts associated with Airport operations. Responding to environmental regulations and international standards, Logan Airport's EMS provides a structure for regulatory compliance and monitoring of a wide range of activities at the Airport that affect the environment, such as air quality, recycling, stormwater pollution prevention, and energy use. More information can be found in Chapter 8, *Environmental Compliance and Management/Water Quality*.

- **Energy Planning.** Massport is studying opportunities to maximize solar installations across Logan Airport and installing electric vehicle infrastructure on the airside and in parking garages. Massport has installed electric charging facilities in all its garages and will also install them in the proposed new garage in front of Terminal E and the expanded Economy Garage (project currently deferred). More information can be found in Chapter 3, *Airport Planning*.

- **Resiliency Planning.** Massport has a robust effort underway that first identified vulnerabilities on the Airport and has incorporated resilient infrastructure design standards for all types of Airport projects. At the end of 2013, Massport initiated a Disaster and Infrastructure Resiliency Planning (DIRP) Study for Logan Airport, the Port of Boston, and Massport's waterfront assets in South and East Boston. The study was completed, and implementation of adaptation initiatives began in late 2014.

In addition to the DIRP Study and its related initiatives, Massport has completed an Authority-wide risk assessment, as part of its strategic planning initiative; issued a *Floodproofing Design Guide*; and has developed a resilience framework to provide consistent metrics for short- and long-term planning and protection of its critical facilities and infrastructure. Massport's *Floodproofing Design Guide* was published in November 2014 and updated in November 2018. Beyond infrastructure resiliency, Massport is also focused on incorporating social and economic resilience into its long-term operational and capital planning.

Operational aspects of the resiliency strategy include the development of Flood Operations Plans for Logan Airport and Massport maritime facilities. These plans were introduced in 2014 and included the planned deployment of temporary flood barriers to protect up to 12 locations of critical infrastructure in the event of severe weather. The test deployments and live event staging for the March 2018 Nor-easters succeeded in managing and tracking flood barrier deployment logistics and effective communication. As a result, Logan Airport's Flood Operations Plans and operational responses have evolved. A web-based coastal flood resiliency application was developed to better manage planning immediately prior to an event impact, and to facilitate operational response and recovery as quickly as possible. Additional locations have been permanently enhanced to prevent flooding.

In 2017, Massport conducted a series of workshops with key stakeholders to review and continuously improve its Flood Operations Plans. In addition, many education and training opportunities have been provided to staff and emergency responders to increase operational preparedness for flood events. In March 2018, Massport conducted several practice deployments of flood barriers at three critical Logan Airport assets. Additionally, Massport developed a flood resiliency application to inform decision-making, facilitate management oversight, and enable real-time field updates via mobile devices before, during, and after storm events. More information can be found in Chapter 3, *Airport Planning*.

- **Sustainability Planning.** Massport has a robust sustainability program and routinely educates employees through a quarterly Sustainable Massport Newsletter, which is included in Appendix J, *Environmental Compliance and Management/Water Quality*. Additionally, Massport undertakes the following sustainable initiatives:
  - The *Logan Airport Sustainability Management Plan (SMP)* takes a comprehensive approach to sustainability including economic vitality, social responsibility, operational efficiency, and natural resource conservation. The *Logan Airport SMP* is intended to promote, integrate, and coordinate sustainability efforts across the Authority. The *Logan Airport SMP* was developed with a framework and implementation plan, with metrics and targets designed to track progress over time. Massport is currently advancing a series of short-term initiatives to help reach its goals in the areas of energy and GHG emissions; community, employee, and passenger well-being; resiliency; materials, waste management, and recycling; and water conservation.
  - The *Massport Annual Sustainability and Resiliency Report* provides a progress summary of sustainability efforts at Logan Airport, and other Massport facilities, based on Massport's sustainability goals and targets established in the *Logan Airport SMP*.
  - Each year since 2015, Massport distributes *Sustainable Massport* calendars to employees and other stakeholders. The calendars are filled with examples of Massport's sustainability projects and successes, and each month highlights aspects of environmental, social, and economic aspects of sustainability to which employees can contribute.

- Massport is continuing to incorporate sustainability considerations into its projects and is currently working on a vision for Massport "Sustainability 2.0." The vision for this next-level planning effort is to implement principles and approaches from the *Logan Airport SMP* at other Massport facilities and to update Massport's sustainability goals and targets. In early 2019, Massport conducted a series of charrettes with Massport staff, tenants, and business partners to help define this vision. Massport is currently working on a detailed set of recommendations for Sustainability 2.0. Updates will be reported in future *Massport Annual Sustainability and Resiliency Reports*.

Projects with Ongoing Mitigation

The following section documents the status of projects with specific Section 61 mitigation commitments, in chronological order. Massport will continue to report on the status of mitigation in EDRs and ESPRs to provide a solid accounting of Massport's commitment to regulatory compliance and to provide information to the community. The status of continuing mitigation requirements is documented in this chapter.

- **West Garage Project,** Executive Office of Energy and Environmental Affairs (EEA) #9790: Phase I and Phase II construction was completed in 2007.
- **International Gateway Project**, EEA #9791: Phase I was completed in 2004; Phase II was completed in 2007; and the final phase has been changed to the Terminal E Modernization Project (EEA #15434) (see below).
- **Replacement Terminal A Project**, EEA #12096: Terminal A opened March 16, 2005.
- **Logan Airside Improvements Planning Project**, EEA #10458: Runway 14-32 opened on November 23, 2006. The Centerfield Taxiway was completed and became fully operational in 2009.
- **Southwest Service Area (SWSA) Redevelopment Program**, EEA #14137: Construction of the Rental Car Center (RCC) program began in the summer of 2010, and the first phase of the facility opened in the fall of 2013. Other phases of the project were completed in 2014.
- **Logan Airport Runway Safety Areas (RSA) Project**, EEA #14442: Construction on the Runway 33L RSA began in June 2011 and was completed in November 2012. The replacement of the Runway 33L approach light pier was completed concurrently with Runway 33L RSA construction. Construction of the Runway 22R Inclined Safety Area (ISA) was completed in the fall of 2014.
- **Terminal E Modernization Project**, EEA #15434: The project will accommodate existing and long range forecasted passenger demand for international service and will include the three gates permitted and approved as part of the International Gateway West Concourse Project in 1996 (but never constructed), and four additional new aircraft contact gates. An Environmental Notification Form (ENF) was filed in October 2015, the combined state and federal Draft Environmental Assessment (EA)/EIR was filed in July 2016, and the Secretary of the EEA issued a Certificate on the Draft EA/EIR on September 16, 2016. Massport filed the Final EA/EIR on September 30, 2016. On November 10, 2016, the FAA issued a Finding of No Significant Impact (FONSI) and on November 14, 2016, a Record of Decision (ROD) for the project, indicating that Massport can now update the Airport Layout Plan (ALP) with the proposed Terminal E Modernization Project. Initial construction began in 2019 (see Chapter 3, *Airport Planning,* for additional information).
- **Logan Airport Parking Project,** EEA #15665: The project involves the phased addition of commercial parking at Logan Airport consistent with the amendment to the Logan Parking Freeze. An ENF was filed

in 2017 concurrent with the MassDEP review of the Logan Parking Freeze Amendment. The ENF was filed to assist reviewers in understanding where and how Massport would add parking at Logan Airport if the amendment was approved. A combined state and federal Draft EIR/EA was filed in May 2019 and was followed by the Final EIR/EA in December 2019. A federal Finding of No Significant Impact (FONSI) was issued by FAA in December 2019. Following completion of the state and federal environmental review process, Massport began final design of the first 2,000 spaces to be constructed in a multi-level garage within the footprint of the existing surface parking lot in front of Terminal E. The timing of construction of Phase I is deferred due to the reduction in passenger activity associated with the ongoing COVID-19 pandemic.

West Garage Project – EEA #9790

Permitting History

- Certificate on the Final EIR issued on March 16, 1995.
- Section 61 Findings approved on March 27, 1995.

Project Status

The West Garage is directly connected to the Central Garage, centralizing the two structures' parking into a larger, single functioning, easily accessible garage. The West Garage Project (**Figure 9-1**) was constructed in two phases. Phase I of the Project provided 3,150 parking spaces that were consolidated from other areas of Logan Airport. The West Garage Project also included construction of elevated walkways connecting the West Garage to Terminals A and E, and improvements to the terminal roadways. The original design of Phase II of the West Garage included the construction of a new structured parking facility adjacent to the West Garage. Instead, Massport concluded it was more cost efficient to proceed with Phase II by adding three additional levels (Levels 5, 6, and 7) to the existing Central Garage. Phase II of the West Garage Project provided approximately 2,800 additional parking spaces.

- **Phase I** – Construction commenced in October 1995 and the garage opened on September 8, 1998. The elevated walkways to the terminals were completed in 2002. Improvements to terminal roadways were completed in 2003.
- **Phase II** – Permitting was completed in 2000 to add three levels to the Central Garage. Construction commenced in 2004 and the entire facility enhancement was completed in 2007.

Table 9-1 lists each of the continuing Section 61 mitigation commitments for the West Garage Project and Massport's progress in achieving these measures. **Table 9-2** details the elements and status of the AFV Program, which was a key mitigation effort associated with the West Garage Project. **Tables 9-1** and **9-2** detail the Section 61 mitigation measures from the West Garage Project Final EIR, dated January 31, 1995, and those measures referenced in the Massport Board vote on the West Garage Project. Many of the mitigation measures for this project have long since been implemented, but it is noted in the tables when there have been recent updates.

Unrelated to this project, in late 2015, Massport completed the West Garage Parking Consolidation Project, which consolidated 2,050 temporary parking spaces as part of an addition to the West Garage and at the existing surface lot between the Logan Office Center and the Harborside Hyatt. The West Garage addition is located on the site of the existing Hilton Hotel parking lot. Construction of these spaces constituted all of the remaining spaces permitted under the Logan Airport Parking Freeze as of that date.[4] On March 20, 2014, EEA issued an Advisory Opinion confirming no MEPA review was required for this project. Construction commenced in the spring of 2015 and was completed in 2016.

4 310 Code of Massachusetts Regulations 7.30 and 40 Code of Federal Regulations 52.1120.

FIGURE 9-1 West Garage Project | **2018/2019 Environmental Data Report**

◆ West Garage Project EEA #9790

Phase I West Garage Construction
Phase II Addition to Central Garage

↑ 0 500 1000 2000 Feet

Table 9-1 West Garage Project Status Report (EEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020)

Mitigation Measure	Status
Parking Pricing	
Parking pricing initiatives: keeping first-hour price high enough to provide a disincentive for drop-off/pick-up.	**Implemented.** Massport continues to evaluate and adjust the first-hour price of parking. In light of the security prohibition on curbside parking, in 2002 Massport reduced the cost of the first half-hour from $4 to $2, the first time it had changed since the first-hour free rate was rescinded in 1998. In June 2007, rates increased to $3 for the first half-hour. Parking rates increased in 2012, 2014, 2016, 2017, and 2019 for on-Airport parking; further details on parking rate increases are provided in **Table 5-6** of Chapter 5, *Ground Access to and from Logan Airport*.
Parking pricing initiatives: keeping the weekly price low enough to encourage vacation travelers to park for a week.	**Implemented.** Massport encourages long-term parking by providing lower cost parking at its Economy Lot and the off-Airport Logan Express lots. The long-term Parking Management Plan lays out a multi-part strategy for efficiently managing parking supply, pricing, and operations. Data on long-term parking use are provided in Chapter 5, *Ground Access to and from Logan Airport*.
Massport will consider means to encourage the use of limited amount of on-Airport commercial parking for long-term parking and promote environmentally positive modes of airport access by air passengers.	**Implemented.** An important element of Massport's strategy to reduce the impact of Airport-related traffic on regional highways and local streets in neighboring communities is the Massport Parking Pricing Policy. Massport's Parking Pricing Policy encourages long-term parking over short-term parking by charging a premium for time spent in the on-Airport parking facilities between one and four hours and substantially reducing the per hour rate for parking durations longer than four hours. This strategy has proved to be a successful incentive for passengers to drive themselves and park long-term at Logan Airport rather than having someone else drop them off or pick them up, thereby reducing the number of trips from four to two. Additional information on parking is provided in Chapter 5, *Ground Access to and from Logan Airport*. The Logan Airport Parking Project, which was approved in 2020, will ultimately provide 5,000 new on-Airport parking spaces in accordance with the amended Logan Airport Parking Freeze. A key goal of the Project is to provide parking for those passengers that would otherwise use drop-off/pick-up modes and generate a higher number of associated trips. The initial 2,000 spaces are planned for the surface lot in front of Terminal E; final design is underway. The timing of construction of Phase I is deferred due to the reduction in passenger activity associated with the pandemic. Future Environmental Data Reports (EDRs) will provide updates on the timing of Phase I and the remaining 3,000 spaces, as available.
Once sufficient data have been collected, Massport will evaluate parking behavior that may be attributable to the modified rates and consider further adjustments in pricing that will assist in achieving Massport's ground transportation goals.	**Implemented.** Massport's parking rate structure is compatible with continued growth in long-term parking and Massport's goal to increase the total high occupancy vehicle (HOV) use by air passengers. Adjustments to hourly parking rates are made over time to reflect usage patterns. Additional information on parking pricing is provided in Chapter 5, *Ground Access to and from Logan Airport*.
Executive Director shall report to Massport annually regarding the effectiveness of parking pricing policy in achieving Massport's ground access goals initiatives and recommend appropriate policy adjustments.	**Implemented**. Through the annual EDR/Environmental Status and Planning Report (ESPR) filings, Massport reports on the effectiveness of parking pricing strategies. Please refer to Chapter 5, *Ground Access to and from Logan Airport*, for additional details on Massport's parking pricing efforts.

Table 9-1 West Garage Project Status Report (EEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Concurrent Ground Access Improvement Mitigation Measures	
Employee Trip Reduction Measures	
Massport will form a Transportation Management Association (Logan TMA) for Logan Airport employees to provide new opportunities for the development of targeted transportation demand management (TDM) strategies for Massport and airport tenant employees.	**Implemented.** In the 1995 Board Resolution, Massport's Executive Director was authorized to expend an initial amount of up to $50,000 for the purpose of organizing the Logan TMA. The Logan TMA was created in March 1997. Massport continues to support the Logan TDM strategies by funding the Logan Sunrise Shuttle at an annual cost of $65,000. Massport continues to conduct outreach through new hire orientation materials and other communications to raise awareness of employee commute options with a focus on HOV modes.
Massport will seek to develop, coordinate, and implement effective TDM strategies to reduce the number of single-occupant trips made by all Logan Airport employees, including outreach to employees about transportation options.	**Implemented.** Massport supports TDM strategies by providing services and by periodically conducting the Massport Employee Survey. The *2019 Logan International Airport Air Passenger Ground-Access Survey (2019 Air Passenger Ground-Access Survey)* is summarized in Chapter 5, *Ground Access to and from Logan Airport*. Massport surveys its employees as part of its MassDEP Rideshare reporting requirements
Massport will encourage participation by all employees, but will particularly target the Airport's largest employers.	**Implemented.** Refer to Chapter 5*, Ground Access to and from Logan Airport,* for more details on the Logan TMA.
Massport will report on the formation and activities of the Logan TMA in the next Generic Environmental Impact Report (GEIR).	**Implemented.** The current status of the Logan TMA is summarized in Chapter 5, *Ground Access to and from Logan Airport*.
Massport proposes to implement a new Logan Express service or other HOV service depending on the needs of the targeted market before Phase II of the West Garage Project is operational.	**Implemented**. The Peabody Logan Express facility opened in September 2001 (see Chapter 5, *Ground Access to and from Logan Airport,* for additional information on Peabody Logan Express), well in advance of this regulatory requirement. At the time of this report's submission, Massport has suspended Peabody Logan Express services due to the COVID-19 pandemic. In 2014, Massport initiated the Back Bay Logan Express pilot service, which provides travelers scheduled trips between the Hynes Convention Center, Copley Square Station, and Logan Airport. This route was initially established as an interim/pilot service to supplement ground access to Logan Airport while the MBTA Green Line at Government Center station was temporarily closed for reconstruction. The new Government Center station reopened in March 2016. Due to growth in demand and growing urban congestion, the service has continued. The Back Bay Logan Express service was relocated from Copley Square to Back Bay Station in 2019. Coincident with the relocation was a reduction in fees from downtown to Logan Airport, free boarding at Logan Airport, and preferred access to security lines for passengers. Due to the COVID-19 pandemic, both Peabody and Back Bay Logan Express service is currently on hold. In 2019, Massport also initiated permitting for additional parking at the Framingham Logan Express site and concept planning for expansion of the Braintree Logan Express site. Approvals for the Framingham expansion were granted in 2020; construction is currently deferred.

Table 9-1 West Garage Project Status Report (EEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Employee Trip Reduction Measures	
Provide an airport shuttle service from South Station Transportation Center. Massport is preparing a feasibility and business plan for a South Station-Logan Airport shuttle service and will implement this service when the Third Harbor Tunnel is opened for commercial traffic. This service will be modeled on the existing, successful Logan Express services and will include frequent bus service between South Station and the airport terminals. *Massport will regularly evaluate the frequency of, and demand for, such shuttle service and will provide such service at the greatest frequency that is practical and effective.*	**Implemented.** In 1997, Massport sponsored the development of a joint public/private partnership with intercity bus operators serving the South Station Transportation Center. The service had limited success largely because of variable operator schedules and the fact that the service operates out of the South Station Transportation Center instead of a location closer to the MBTA Red Line South Station stop. Following the interim Logan DART service between Logan Airport and South Station in 2000, in June 2005, Massport and the MBTA jointly commenced full Silver Line Airport Service, providing a direct connection between South Station and each Logan Airport terminal. Refer to Chapter 5, *Ground Access to and from Logan Airport,* for additional information on the Silver Line. **Implemented.** Massport continues regular collaboration with the MBTA on the Silver Line Airport service and makes adjustments as necessary. Beginning in May 2012, Massport initiated a pilot program offering free rides on the Silver Line from Logan Airport to downtown Boston to promote HOV usage and heighten awareness of public transit options. The purpose of the program was to promote ridership, operations, and customer service. Free service from Logan Airport continues as of the date of this *2018/2019 EDR*. Additionally, Massport plans to purchase eight MBTA Silver Line buses as part of a forthcoming MBTA procurement.
Massport will implement a new water shuttle service in Boston Harbor before the opening of Phase I of the West Garage Project. The water shuttle would run between Logan Airport and one, or possibly more, sites in the Harbor.	**Implemented.** Massport identified a number of possible destinations for a new water shuttle service, with the Quincy Shipyard and Long Wharf sites meeting the basic service parameters. Harbor Express was chosen as the water shuttle operator and began operation between the Airport and these two sites in November 1996. Massport continues to support the City Water Taxi operations. Refer to Chapter 5, *Ground Access to and from Logan Airport,* for water shuttle ridership information.
The Executive Director shall make recommendations to Massport for budgetary appropriations to establish and implement the new ground access services on a schedule that permits Massport to implement the new ground access services within these time frames.	**Implemented.** Massport's Executive Director/CEO recommends budgetary appropriations for ground access services on an annual basis.
Enhancement of Existing HOV Services: Logan Express	
Expand Logan Express hours of service.	**Implemented.** During 2019, service was offered from Braintree as early as 2:00 AM and as late as 11:00 PM; from Framingham as early as 2:15 AM and as late as 11:00 PM; from Woburn as early as 2:15 AM and as late as 11:00 PM; and from Peabody as early as 3:15 AM and as late as 10:15 PM. Buses leave every hour or half hour. Logan Express buses departed from Logan Airport as late at 1:15 AM. The Braintree service was expanded in 2019 to operate on 20-minute frequencies. The Back Bay Logan Express operated daily trips between the hours of 5:00 AM and 10:00 PM. Logan Express schedules were adjusted in March 2020 in response to the COVID-19 pandemic. In early December, Massport suspended Woburn Logan Express service. Roughly 90 percent of users were employees, who will now be accommodated on-Airport.

Table 9-1 West Garage Project Status Report (EEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Enhancement of Existing HOV Services: Logan Express	
Expand Logan Express hours of service.	Schedules are available at http://www.massport.com/logan-airport/to-from-logan/transportation-options/logan-express/.
Provide a guaranteed ride home for Logan Express users.	**Implemented and subsequently modified.** From January 1995 until November 2001, Massport provided this service for air passengers and Logan TMA members. Due to financial constraints following September 11, 2001, this program was suspended for those passengers arriving after midnight with pre-purchased round-trip Logan Express tickets. Extended service now provides nearly 24-hour service at several Logan Express locations.
Provide Logan Express price incentives.	**Implemented.** Massport continues to monitor price incentives and implements additional incentives to promote Logan Express ridership, particularly during vacation periods and other periods of peak airport activity. In April 2011, Logan Express sites offered a discounted rate for parking. A survey of Logan Express passengers revealed that drop-off activity at Logan Airport was reduced and the demand for parking at Logan Airport was reduced during the period of the discounted Logan Express parking. To encourage greater ridership, Massport restructured parking rates, which lowered parking rates to $7 per day from $11 per day at Logan Express parking lots. These rates have been in effect since March 1, 2012 (and resulted in increased Logan Express passenger activity at rates greater than the rate of increase in Logan Airport air passengers). Additional seasonal and holiday promotions are also offered.
Develop an additional Logan Express service.	**Implemented.** Massport opened a fourth Logan Express in Peabody, Massachusetts in September 2001, several years before the Section 61 commitment date of the opening of Phase II of the West Garage Project. While the new service was initially planned to operate on a half-hour schedule like the Braintree, Framingham, and Woburn services, because of the dramatic air passenger reductions after September 11, 2001, (during Peabody's first week of service), to cut costs, Massport operated the Peabody Logan Express on hourly frequencies. In January 2004, in light of low levels of ridership on the Peabody Logan Express, Massport doubled service by going to a half-hourly schedule in an effort to stimulate ridership growth at Peabody. In 2018 and 2019, the service operated on an hourly weekday schedule. In 2014, Massport initiated an interim Back Bay Logan Express pilot service, which provides travelers with three scheduled trips per hour between the Hynes Convention Center, Copley Square Station, and Logan Airport. The Back Bay Logan Express service was relocated from Copley Square to Back Bay station in May 2019, along with discounted one-way fares and free service from Logan Airport. Security line priority status to Logan Express Back Bay riders is also provided. Massport plan to operate a new urban Logan Express location between North Station and Logan Airport is currently on-hold (although Massport procured buses for this service in 2020). Similarly, planning for potential additional locations in Metro West and on the North Shore is also on hold.
Enhancement of Existing HOV Services: Water Transportation	
In conjunction with the MBTA, Massport will pursue joint ticketing opportunities for the Hingham Commuter Boat and the Logan Airport Water Shuttle.	**Implemented.** This ticketing program was implemented in mid-1995 and discontinued in 2000 since many of the former users of the program used the Harbor Express Service direct from Quincy to Logan Airport at that time. Service is now provided from Hingham and Hull directly to Logan Airport (via Long Wharf).

Table 9-1 West Garage Project Status Report (EEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Enhancement of Existing HOV Services: Water Transportation	
Massport is reviewing the fee schedules and operating requirements of the dock to make it more accessible and convenient to potential water taxi operators.	**Implemented.** In the fall of 1995, Massport made physical improvements to a low-freeboard float at the Logan Airport Dock to create a dock capable of accommodating smaller vessels such as water taxis. In the fall of 2002, Massport completed expansion of the Harborside Dock to accommodate the demand of additional vessels and to comply with handicapped accessibility requirements. The improved dock increases capacity from a two-float system to a seven-float system to accommodate the various water shuttles, taxis, and charter boats that are licensed to use it. Massport continues to provide free on-Airport shuttle service to the water shuttle dock.
Initiate a new Boston Harbor Water shuttle service.	**Implemented.** Harbor Express service, between Logan Airport and the South Shore, began in November 1996, well before the opening of Phase I of the West Garage in September 1998. In 2001, the MBTA took over operations of this service.
Expand docking capacity at Logan Airport for water taxi and other services.	**Implemented.** Massport accommodates water taxi services, enhanced the dock as described above, provides communication links for passengers to call the taxi, and allows taxi passengers to use the free shuttle buses to access the terminals from the dock. Water taxi information is posted on the Massport website. Details on water taxi services are provided in Chapter 5, *Ground Access to and from Logan Airport*.
Other Measures	
Coordinate with public and private entities to provide more extensive radio, television, and telephone announcements of poor traffic conditions with suggestions for alternative access modes.	**Implemented.** Callers to the Customer Information Line (1-800-23LOGAN) may access the latest traffic information, flight status, parking information, cell phone waiting lot information, or learn about alternative forms of transportation to and from Logan Airport. Starting in August 1999, real-time traffic information and parking became accessible on Massport's website. Massport regularly contacts the media to inform the public about roadway changes, parking shortages, and to encourage travelers to use HOV services. Similar information is disseminated on the Logan Airport e-mail subscriber list, the Massport website, Facebook, and on Twitter at twitter.com/bostonlogan.
HOV Marketing and advertising. Massport will continue the advertising and marketing programs for HOV services with an emphasis on promoting MBTA, Logan Express and water shuttle services to and from the Airport.	**Implemented.** Massport continues to market Logan Express services via Massport's website and other media. Massport continues to promote HOV services including availability, schedules, and fares to consumers through the Customer Information Line at 1-800-23LOGAN and the website, which provide up-to-the-minute information. Massport has actively promoted passenger water transportation in Boston Harbor for more than 20 years, playing a leadership role in policy development, planning, and promotions. This has included promoting vessel services at Logan Airport in the following ways:

Table 9-1 West Garage Project Status Report (EEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Other Measures	
HOV Marketing and advertising. Massport will continue the advertising and marketing programs for HOV services with an emphasis on promoting MBTA, Logan Express and water shuttle services to and from the Airport.	■ Annual updates and in-terminal distribution of a brochure promoting water transportation at Logan Airport; ■ Annual updates of a harbor-wide water transportation map showing routes serving Logan Airport along with other routes and landings – Massport provides this map to the MBTA, area non-profits, and others interested in promoting passenger water transportation in Boston Harbor. Currently all water shuttle services are suspended; ■ Updated information promoting passenger water transportation at Logan Airport on 1-800-23LOGAN and www.massport.com; and ■ Collecting, tracking, and disseminating passenger water transportation ridership data for Logan Airport passengers to aid in planning and facility development.
Prepare an inventory of private scheduled services including origins/destinations, schedule, and cost.	**Implemented.** Massport continues to update and track information and services by hundreds of privately operated passenger services certified to operate at Logan Airport. Industry changes with such operations make publication of reliable service and schedule information impractical, if not impossible. However, Massport continued to expand and update information on transportation options to Logan Airport using: ■ Information and links to transportation companies on the Massport website. Some sites accessed through internet links provided passengers with online reservation services. ■ Most scheduled service operators provided placards with current schedules posted in bus stop shelters located on the curb at each terminal. Individual bus schedules were also available at the information booths. Transportation information database for online assistance at Logan Airport terminal information booths.
Proceed with environmental review and seek funding for construction of People Mover system.	**Implemented.** In 1998, Massport completed the Environmental Assessment (EA) and Major Investment Study for the *Logan Airport Intermodal Transit Connector* (AITC). The AITC evolved out of the People Mover process and evaluated new access routes to both the MBTA Blue Line and the South Station Transportation Center. On February 25, 1997, Massport submitted to the U.S. House Committee on Transportation and Infrastructure an application for Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) funds for the next phase of environmental review, planning, and design of the AITC. Congressman J. Joseph Moakley was the congressional sponsor; the project also had the support from the Secretary of Transportation and the U.S. Environmental Protection Agency (EPA). The Logan AITC was included, for an unspecified funding level, in the 1997 ISTEA reauthorization bill.

Table 9-1 West Garage Project Status Report (EEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Other Measures	
Proceed with environmental review and seek funding for construction of People Mover system.	In 1998, Massport received a Certificate on a Notice of Project Change (NPC) for the People Mover from the Secretary of the Executive Office of Energy and Environmental Affairs (EEA) and a Finding of No Significant Impact (FONSI) on an Environmental Assessment (EA) from the Federal Transit Authority. In June 2001, Massport and the MBTA executed an interagency agreement for the purchase of eight Silver Line dual mode buses and the Massport Board approved the expenditure of approximately $13 million for this purchase. In 2004, Massport and the MBTA finalized the 10-year/20 million-dollar Interagency Operating & Maintenance Agreement. Initial Silver Line service to the Airport began in December 2004 and full service began in June 2005. Services continue to be adjusted to meet growing demand as described in *Chapter 5, Ground Access to and from Logan Airport*. Several options were identified in 2019 to reduce on-Airport congestion and improve on-Airport ground access efficiency. Initial options included dedicated HOV bus lanes, the creation of an intermodal transportation center with bus service to terminals, the construction of an Automated People Mover (APM), or some combination of these improvements (see Chapter 3, *Airport Planning,* for more information). These and other options are currently on hold and will be revisited once passenger levels recover closer to 2019 levels.
Alternative Fuels Program. Massport is carrying out an extensive program to convert existing Massport-owned service vehicles to environmentally preferable sources.	**Implemented. Table 9-2** details Massport's progress in achieving these measures. The current focus is on a transition to non-emitting electric vehicle where suitable replacements are available.
Massport will assess progress towards the achievement of HOV goals using on-Airport Automated Traffic Monitoring Systems (ATMS).	**Implemented.** Massport has an ATMS plan that provides daily traffic counts at all gateways and other critical locations. Massport uses technologies that utilize on-Airport traffic signal controllers and loops for traffic counting. The Logan Airport ATMS uses technologies that detect vehicle movement (inductive loop lines and microwave sensors). The project is complete and the upgraded ATMS is functioning as planned and designed.
Massport will assess progress towards the achievement of HOV goals by monitoring parked vehicles using systems such as the parking and revenue control (PARC) system.	**Implemented.** Massport monitors all parking activity at Logan Airport and inventories all commercial parking facilities on a daily basis. Updated PARC systems were installed in the Terminal B Garage in 2004, with the Central/West Garage following in 2005. Terminal E parking areas and the Economy Garage also have PARC systems, as will the planned new parking areas.
Measuring, Monitoring, and Evaluating Ground Access Improvements	
Monitor HOV Services (Logan Express, MBTA, water shuttle, limousine/bus, and taxi).	**Implemented.** Massport maintains a "real time" log of dispatcher reports for Logan Express, the taxi pool, and the bus/limousine pool and other ground transportation operations at Logan Airport. Massport coordinates with the MBTA and the operators of all water shuttles serving Logan Airport to track ridership and service schedules. Daily Logan Express ridership and operations data are submitted monthly to Massport. Massport maintains a Passenger Water Transportation Ridership Summary on a monthly basis. Massport maintains a continuing record, the Ground Transportation Unit (GTU) Daily Event Log, of all occurrences impacting the Airport roadways, terminal curbs, and access roads. This log cites such events as accidents, lane closures, bus delays, as well as routine and non-transportation events.

Table 9-1 West Garage Project Status Report (EEA #9790)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Measuring, Monitoring, and Evaluating Ground Access Improvements	
Monitor HOV Services (Logan Express, MBTA, water shuttle, limousine/bus, and taxi).	Massport's Ground Transportation Operations Center (GTOC) located in the Rental Car Center (RCC) is the 24/7 command center for all transportation information in and around Logan Airport. GTOC staff monitor up to the minute traffic information to ensure Logan Airport bus services are running efficiently.
Monitor passenger activity and employee modes of transportation.	**Implemented.** The *2019 Air Passenger Ground-Access Survey* was conducted in the spring of 2019 and is summarized in Chapter 5, *Ground Access to and from Logan Airport*.
Massport supports the use of Automated Vehicle Identification (AVI) to monitor, manage, and facilitate efficient traffic operations at Logan Airport and elsewhere on the regional transportation system.	**Implemented.** An AVI system for Massport's Logan Airport shuttles and Logan Express buses was implemented. All new buses are being procured with AVI/global positioning system (GPS), and are compatible with the "next bus" arrival notification system. In addition, the GTOC in the RCC is outfitted with the required equipment to track the clean-fuel unified bus fleet.
Track the effectiveness of ground access measures.	**Implemented.** Massport continues to track the effectiveness of its ground access mitigation programs in its annual MEPA filings. See Chapter 5, *Ground Access to and from Logan Airport,* for 2018 and 2019 details.

Source: Massport.
Note: Text in *italics* detailing the mitigation measures is from Section IV, Mitigation of the West Garage Final EIR, January 31, 1995.

Table 9-2 describes the Alternative Fuel Program, which was part of the West Garage Section 61 commitments.

Table 9-2 Alternative Fuel Program — Details of Ongoing Section 61 Mitigation Measures for the West Garage Project (as of October 31, 2020)

Program Element	Projected Date of Completion/ Acquisition	Status
Purchase four electric passenger utility vehicles	Winter 1995	**Implemented.**
Purchase five electric sedans	Winter and Summer 1995	**Implemented.**
Build compressed natural gas (CNG) quick-fill station	Spring 1995	**Implemented.** The CNG station has been operational since 1995. It is one of New England's largest retail CNG quick fill stations and serves Massport CNG vehicles (22 of which are the Massport-owned 42-foot CNG buses) along with a dozen Airport tenants including nearby hotel CNG shuttle bus fleets. In 2018 and 2019, the station dispensed approximately 25,750 and 24,445 gasoline-equivalent gallons per month for Massport vehicles in 2018 and 2019, respectively.
Purchase five electric buses	Spring and Summer 1995	**Implemented.** Massport purchased two electric buses and leased one that operated at Logan Airport between 1996 and 2001. After more than six years of testing and evaluation, those early electric buses were neither durable nor dependable enough to function effectively in the demanding airport operating environment. As EV technology has advanced, Massport supports the use of AFV by replacing older fleet vehicles with alternative fuel fleet vehicles and continues operation of Massport's "Clean-Air-Cab" incentive program for AFVs. Massport's current focus is a continued transition to EV. Massport encourages conversion to AFVs/alternative power vehicles (APVs) by others through such policies as 50 percent discounts in AFV/APV ground access fees to limousines, vans, and buses; limited "front-of-line" taxi pool privileges to hybrid and AFVs/APVs; and preferred parking for hybrid and AFVs/APVs at Logan Airport parking facilities. As part of the ongoing Alternative Fuel Program, Massport is facilitating the replacement of gas- and diesel-powered ground service equipment (GSE) with all-electric GSE (eGSE) by the end of 2027, as commercially available. The U.S. Environmental Protection Agency (EPA) awarded a grant in 2018 to Massport to replace some gas- and diesel-powered GSE at Logan Airport in a collaborative effort to reduce emissions and improve air quality. American Airlines will contribute the entire match and Massport will provide support in the way of grant administration and data tracking. This grant will allow Massport to replace 25 pieces of gas- and diesel-powered GSE with all-electric versions. This grant will be used in conjunction with a Federal Aviation Administration (FAA) Voluntary Airport Low Emission (VALE) grant Massport received in the fall of 2018 to install eGSE charging stations for the Terminal B Optimization Project. This VALE grant awarded funding for American Airlines' charging infrastructure at Terminal B to install 50 eGSE charging stations. In 2019, through the same program, Massport was awarded a grant for jetBlue Airways' charging infrastructure at Terminal C, Massport contributed toward the

Table 9-2 Alternative Fuel Program — Details of Ongoing Section 61 Mitigation Measures for the West Garage Project (as of October 31, 2020) (Continued)

Program Element	Projected Date of Completion/ Acquisition	Status
		installation of 42 eGSE charging stations. Additionally, in 2019 Massport was awarded by the EPA under DERA a grant to replace 44 diesel-powered GSE equipment with all-electric baggage tractors, belt loaders, and push back tugs. GSE owners at Logan Airport will contribute a match. In 2019, Massport was awarded through the Massachusetts Department of Environmental Protection's (MassDEP's) Volkswagen Diesel Settlements & Environmental Mitigation Open Solicitation grant program, aimed at reducing nitrogen oxide (NO_X) and greenhouse gas (GHG) emissions, a grant to acquire eGSE in partnership with jetBlue Airways. This will replace 31 pieces of GSE with new eGSE and install four eGSE charging stations at Terminal C. United Airlines also privately pursed this grant and was awarded funding.
Purchase five electric pick-up trucks	Spring 1995	**Implemented.**
Use soy-blend diesel fuel	Spring 1995	**Implemented.** Massport's shuttle fleet operated on soy diesel from 1995 to 1999. In 1999, all the buses were replaced with CNG buses. This fleet was fully replaced in 2012 by CNG and clean-diesel/electric hybrid buses.
Purchase additional AFVs	Spring 1995	**Implemented.** Refer to Chapter 7, *Air Quality/Emission Reductions,* for a list of AFVs.
Purchase six CNG buses	Summer 1995	**Implemented.** The initial fleet of 26 CNG shuttle buses was fully replaced in 2012 with 32 60-foot clean diesel/electric hybrid buses and 18 42-foot CNG buses. Three CNG buses were added to the fleet in 2015, increasing the total from 18 to 21; and one additional CNG bus was added in 2016, increasing the total from 21 to 22.
Purchase four electric vans	Summer 1995	**Implemented.**
Install quick-charge kiosks for electric vehicles	Summer 1995	**Implemented.** Massport provides 178 hybrid, electric, and AFV only on-Airport parking spaces spread out among the Terminal and Economy Garage parking locations. Twenty-six of these spaces provide electric charging spaces convenient to the terminals. Massport has increased the availability of EV charging stations so that 150 percent of demand is available at all facilities at all times.
Develop slow-charge infrastructure	Ongoing	**Implemented.** The original electric charging infrastructure included 15 inductive charging locations. Currently, these are not in use because there are no vehicles using inductive charging. In 2012, Massport installed 13 Level 2 electric vehicle (EV) charging stations to accommodate a total of 26 vehicles in the Central Garage and Terminal B parking areas. The Framingham Logan Express Garage also has two EV charging stations. Massport plans to add EV charging infrastructure to all new parking facilities. Massport increased the availability of EV charging stations so that 150 percent of demand is available at all facilities at all times.

Source: Massport.

International Gateway Project (Terminal E) – EEA #9791

Permitting History:

- Certificate on the Final EIR issued on December 2, 1996.
- Section 61 Findings submitted to EEA on June 26, 1997.

Project Status

The International Gateway Project (**Figure 9-2**) expanded and upgraded Terminal E to provide better service to international passengers. The original Terminal E was opened in 1974 and over time became outdated and too small to accommodate the growth in international travel. This project is being constructed in phases:

- **Phase I – Complete.** This phase included a weather-protected outside airside bus portico with an elevator and escalator linking the ground floor to the second floor to accommodate passengers arriving on remotely parked aircraft (that are unable to park at a gate because it is occupied by another aircraft).
- **Phase II – Complete.** This phase enlarged Logan Airport's congested Federal Inspection Services (FIS) Facility and improved the meeter/greeter lobby and the ticketing area of Terminal E to maximize passenger convenience and reduce processing times in the terminal. To reduce curb and roadway congestion at Terminal E, this project included a new separated roadway system for arrivals and departures.
- **Future Phase – Transitioned to Terminal E Modernization Project (EEA #15434).** The West Concourse element of the International Gateway Project and its three additional gates were approved but not constructed. These three gates are now included as an element of the ongoing Terminal E Modernization Project (see below).

Construction of Phases I and II of this project commenced in the summer of 1998. Phase I was completed in 2004. The departure level of the terminal, including the new ticketing hall and departure level roadway, opened in May 2003. Phase II Enlargement of the FIS Facility and construction of the new arrivals level was completed in July 2007. Preliminary work was completed for the West Concourse including planning for three additional contact gates that were not constructed. In 2017, Massport reconfigured three existing gates to be compatible with wide-body, double-deck aircraft such as the A-380. Additional information on the status of the International Gateway project is available in Chapter 3, *Airport Planning*.

As part of a separate project, Massport has approval for the modernization of Terminal E. The Terminal E Modernization Project will accommodate existing and forecasted long-range passenger demand for international service and will include the three permitted but not built gates from the West Concourse component of the International Gateway Project, as well as four additional new aircraft contact gates. An ENF was filed in October 2015. The Draft EIR/EA was filed in July 2016, and the Final EA/EIR was filed in September 2016. The FAA issued a FONSI on November 10, 2016, and a ROD on November 14, 2016 for the project (see Chapter 3*, Airport Planning,* for additional information). Initial construction began in 2019. Mitigation commitments associated with the Terminal E Modernization Project (EEA #15434) are discussed later in this chapter.

Table 9-3 lists each of the continuing mitigation measures for the International Gateway Project in the Section 61 Findings, along with Massport's progress in achieving these measures through the end of 2019. Many of the mitigation measures for this project have long since been implemented, but it is noted in the tables when there have been recent updates. Completed design and construction phase measures are described in previous EDRs.

FIGURE 9-2 International Gateway Project | **2018/2019 Environmental Data Report**

Note: Runway 14-32 construction completed in November 2006.

◆ International Gateway Project (Terminal E) - EEA #9791

0 500 1000 2000 Feet

**Table 9-3 International Gateway Project Status Report (EEA #9791)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020)**

Mitigation Measure	Status
Alternative Fuel Outreach Program	
Massport is working cooperatively with the U.S. Environmental Protection Agency (EPA) and regional utility providers in coordinating an ongoing outreach program aimed at promoting the use of clean-burning alternative fuels. This program, which is also supported by fuel providers, vendors, and state and federal agencies, will offer information to airport tenants in the following areas: ▪ *Notification of grant programs or other financial incentives for vehicle conversions.* ▪ *Assistance in cost-benefit analysis for conversion of conventionally fueled vehicles to Alternative Fuel Vehicles (AFVs).* ▪ *Assistance in placing airport tenants in contact with alternative fuel suppliers and product vendors.*	**Implemented.** Massport continues to work with the EPA, regional utility providers and other stakeholders in evolving Logan Airport's fleets to alternative power sources. In line with current technologies, Massport's focus is on transitioning to electric vehicles (EV) where suitable replacement vehicles are available.
High Occupancy Vehicle (HOV) Promotion	
Massport will reserve terminal space for ground transportation ticket sales, reservations, and information.	**Implemented.** In a joint venture with the Massachusetts Bay Transportation Authority (MBTA), Charlie Card automated fare collection equipment was installed in all Logan Airport terminals in 2006. Since mid-2012, in an effort to encourage greater transit ridership, Massport continues to offer free boarding of the Silver Line at Logan Airport. Free Silver Line continued through the date of this report. In 2019, Massport added the Back Bay Logan Express to the "free from Logan" HOV program. Additional ground transportation information is provided om Massport's website at http://www.massport.com/logan-airport/to-from-logan/transportation-options/.
Attractive and distinctive signage and graphics will be utilized inside the terminal and out at the curb to clearly mark access to Logan Express, MBTA, water transportation, and other HOV options.	**Implemented.** Signage is installed in the terminal and at the curbside identifying HOV curb locations. In 2012, Massport installed new digital signage at all terminal Silver Line curb locations to indicate next bus wait times, which has improved passenger convenience.
As HOV services continue to develop and expand at Terminal E, Massport will expand its web page to encompass these new services and initiatives.	**Implemented.** Massport continues to reflect service changes on its website.
Massport and the MBTA will offer, on a trial basis, the sale of MBTA tokens via a vending machine in the baggage claim area of Terminal C.	**Implemented.** The MBTA Charlie Card machines are located at the MBTA's Blue Line Airport Station and in each of the Logan Airport passenger terminals. Massport continues to offer free service to Airport Station and the water shuttle dock with its fleet of compressed natural gas (CNG) and clean diesel/electric hybrid buses. Since the summer of 2012, Massport continues to sponsor free rides on the Silver Line from Logan Airport to downtown Boston. In 2019, Massport

Table 9-3 International Gateway Project Status Report (EEA #9791)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
High Occupancy Vehicle (HOV) Promotion	
Massport and the MBTA will offer, on a trial basis, the sale of MBTA tokens via a vending machine in the baggage claim area of Terminal C.	added the Back Bay Logan Express to the "free from Logan" HOV program. Back Bay Logan Express service is currently suspended due to the COVID-19 pandemic.

Source: Massport.
Note: Text in *italics* detailing the mitigation measures is excerpted from the Section 61 Findings submitted to EEA, June 26, 1997.

Replacement Terminal A Project – EEA #12096

Permitting History

- Certificate on the Final EIR issued on November 16, 2000.
- Section 61 Findings submitted to EEA on August 31, 2001.

Project Status

The Replacement Terminal A Project (**Figure 9-3**) replaced the original Terminal A with a main terminal linked to a satellite concourse. The new Terminal A opened on March 16, 2005.

In the spring of 2006, Delta Air Lines and Massport submitted an application for certification of Terminal A under the U.S. Green Building Council's (USGBC) Leadership in Energy and Environmental Design (LEED®) Green Building Rating System™. LEED certification was awarded in June 2006, making Terminal A the first airport terminal in the world to be awarded LEED certification.

The following sustainable elements were incorporated into Terminal A:

- **Water conservation** – low-flow toilets and drip, rather than spray, irrigation.
- **Atmosphere protection** – zero use of chlorofluorocarbon-based, hydrochlorofluorocarbon-based, or halon refrigerants.
- **Energy conservation** – special roofing and paving materials that reflect solar radiation. Solar panels were installed on the roof of Terminal A in 2012.
- **Materials and resources conservation** – more than 10 percent of all the building materials used to construct the terminal were from recycled materials.
- **Enhanced indoor environmental air quality** – low and volatile organic compound (VOC) free adhesives, sealants, paints, and carpets.
- **Sustainable sites** – bicycle racks.

Table 9-4 lists each mitigation measure in the Section 61 Findings along with Massport's progress in achieving these measures through the end of October 2020.

FIGURE 9-3 Replacement Terminal A Project | **2018/2019 Environmental Data Report**

◆ Terminal A Replacement Project - EEA #12096

0 450 900 1800 Feet

Table 9-4 Replacement Terminal A Project Status Report (EEA #12096)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020)

Mitigation Measure	Status
Project Design Mitigation	
Logan Transportation Management Association (TMA) Participation	
Delta Air Lines, Inc. to join Massport's Logan TMA and designate an Employee Transportation Advisor.	**Implemented.** Delta Air Lines joined the Logan TMA and designated an Employee Transportation Advisor.
Additionally, Delta Air Lines will provide the following services as part of their Transportation Demand Management Program through the Logan TMA Transportation subsidy for full-time Delta Air Lines employees at Logan Airport; ride matching/carpooling; vanpooling; guaranteed ride home; preferential parking for high occupancy vehicles (HOVs); shuttle to and from employee parking.	**Implemented.** Transportation Demand Management (TDM) services are provided through Delta Air Lines and the Logan TMA.
Recycling Program	
The Replacement Terminal A will be included in Massport's terminal recycling program.	**Implemented.** In 2013, Massport converted to single-stream recycling in all terminals. Massport established aggressive recycling goals as part of its 2015 *Logan Airport Sustainability Management Plan (SMP)* and is actively working to reduce waste and increase its recycling rate. As part of this effort, Massport installed liquid diversion stations at the security checkpoint for Terminals A, B, C, and E in the spring of 2016. Passengers are now able to empty their bottles before security and re-fill them again on the secure side for the remainder of their journey.
High Occupancy Vehicle (HOV) Promotion	
HOV access can be accommodated on the departures level and will be designated near main entrances to the terminal building to ensure efficient and convenient unloading by air passengers who use these mode-types to access the Airport. *The inner-most curb of [the arrivals level] will be designated exclusively for HOVs and taxis, similar to the departures level.*	**Implemented.** HOV modes have preferential access to Terminal A for passenger convenience at both the arrival and departure levels. Coinciding with the opening of the Rental Car Center (RCC) (and its new on-Airport shuttle bus operations), in September 2013, Massport made improvements to the terminal curbsides to increase access for HOV, transit, and shared-ride modes. The improvements followed several general principles: situate HOV modes to the curb closest to the terminal and locate the Airport's Blue Line/RCC shuttle stop adjacent to the Silver Line stop. Terminals B, C, and E underwent the most significant changes; in fact, the ground level of the Terminal B garage was converted to a taxi and limousine (and subsequently the RideApp pick-up area, eliminating all commercial parking from that level, and allowing extra curb space to be better allocated among the remaining HOV and other modes. Terminal A, which already had the primary HOV modes pick-up at the terminal curb (and private vehicles pick-up at the second/outer curb), underwent the fewest changes (notably relocating the Silver Line bus stop to be adjacent to the Blue Line/RCC shuttle stop). The curb improvements also included adding electronic "next bus arrival time" displays for the Massport shuttles, MBTA Silver Line, and Logan Express buses.

Table 9-4 Replacement Terminal A Project Status Report (EEA #12096) Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Ground Service Equipment (GSE) Conversion	
In conjunction with the Project, Delta Air Lines will implement a program for conversion of its entire GSE fleet at Terminal A as soon as viable alternative fueled fleet vehicles become available and can be effectively integrated into Delta Air Lines' operations at Terminal A. Delta Air Lines will introduce battery powered baggage tugs and belt loaders with the replacement terminal and convert this portion of the GSE fleet by the end of 2008. This represents over 40 percent of Delta Air Lines' current GSE fleet.	**Implemented.** Terminal A incorporates infrastructure for GSE charging. In September 2009, Massport approved a 3-million-dollar loan to Delta Air Lines for the purchase of battery-powered baggage tugs and battery powered-baggage conveyor belt vehicles. Delta Air Lines purchased 50 electric baggage cart tugs, 25 electric baggage conveyor belt vehicles, and charging stations for each vehicle. Thirty-two GSE chargers are currently serving electric GSE. Massport is facilitating the replacement of gas- and diesel-powered GSE with electric equivalents by the end of 2027, as commercially available.
Delta Air Lines will also examine the feasibility of locating a Compressed Natural Gas (CNG) fill station at Terminal A. The availability of a CNG fueling station would facilitate conventionally-fueled vehicles to be replaced with CNG-fueled vehicles where this vehicle option is offered. Delta Air Lines will introduce these vehicles into its GSE fleet as soon as they become available and are determined to be feasible and practicable for use at Terminal A.	**Implemented.** Delta Air Lines examined the feasibility of locating the CNG fill station at Terminal A and determined it to be infeasible, given that the GSE conversions are trending toward electric vehicles and electric vehicle infrastructure. A public access CNG fuel facility is available on the Airport at 81 North Service Road. Massport is facilitating the replacement of gas- and diesel-powered GSE with electric equivalents by the end of 2027, as commercially available. Massport is advancing plans to extend the infrastructure for plug-in GSE to other locations.
Where new alternative fuel vehicles (AFVs) are developed and determined to be cost effective and in available supplies, Delta Air Lines will integrate their use into its Terminal A GSE fleet operations.	**Implemented.** As described earlier, Delta Air Lines has electric baggage tugs and belt loaders and will continue to determine the feasibility of integrating other electric GSE, as available. Massport is facilitating the replacement of gas- and diesel-powered GSE with electric equivalents by the end of 2027, as commercially available.
Finally, Delta Air Lines will provide Massport with an annual status report/update on the GSE conversion program at Terminal A, for inclusion in Massport's annual Environmental Data Report (EDR).	**Implemented.** Terminal A includes 32 electric charging stations for Delta Air Lines' electric ramp vehicles. As part of an Airport-wide initiative, Massport is facilitating the replacement of gas- and diesel-powered GSE with electric equivalents by the end of 2027, as commercially available.
Operational Mitigation Measures	
Minimizing nighttime movement of aircraft to and from hardstand positions.	**Implemented.** In accordance with the Noise Rules, Massport continues to restrict nighttime movement of aircraft under its own power between 10:00 PM and 7:00 AM, and Massport also requires towing during this time period.

Table 9-4 Replacement Terminal A Project Status Report (EEA #12096)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Using single engine taxiing and pushback to the extent feasible and practicable, recognizing that such use is always at the discretion of the pilot in charge of the aircraft based upon his or her experience and safety and operational considerations.	**Implemented.** Massport annually issues letters to air carriers in support of single engine taxiing when consistent with safety procedures. Massport is an active member of the Federal Aviation Administration (FAA) Partnership for Air Transportation Noise and Emissions Reduction (PARTNER) program on reducing noise and emissions. A 2010 Massachusetts Institute of Technology (MIT) paper (as provided in the *2010 EDR*) confirmed earlier Massport survey findings that single engine taxiing is an important operational measure used by airlines to conserve fuel and is extensively used at Logan Airport. Based on those findings, Massport has tailored ongoing communication to airlines to further encourage the use of single engine taxiing, when safe to do so, within the Logan Airport operational context. In 2018 and 2019, Massport sent letters to the Boston airline community and the Logan Airport user community encouraging them to consider the use of single engine taxiing when safe to do so. This is provided in Appendix L, *Reduced/Single Engine Taxiing at Logan Airport Memoranda*.
Testing alternative de-icing methods to reduce the amount of glycol usage.	**Ongoing.** Delta Air Lines participated in the *Logan Deicer Management Feasibility Study* to evaluate alternatives to reduce discharges to Boston Harbor. The study report was submitted to the U.S. Environmental Protection Agency (EPA) in 2017.

Source: Massport.
Note: Text in *italics* detailing the mitigation measures is excerpted from the Section 61 Findings submitted to EEA, August 31, 2001.

Logan Airside Improvements Planning Project – EEA #10458

Permitting History

- Certificate on the Final EIR issued on June 15, 2001.
- Section 61 Findings, dated June 8, 2001, on the Final EIR.
- In June 2002, FAA filed a Final Environmental Impact Statement (Final EIS) and issued the federal Record of Decision (ROD) in August 2002 approving a unidirectional runway and other improvements, but deferred a decision on the centerfield taxiway pending additional review by FAA.
- In November 2003, the Superior Court of the Commonwealth modified a 1976 injunction prohibiting construction of a new runway at Logan Airport, pending further environmental review. The injunction modification allowed construction of the runway in accordance with the Secretary of EEA's Certificate on the Final EIR and FAA's ROD on the Final EIS.
- In accordance with the Secretary of EEA's Certificate on the Final EIR, Massport amended its final Section 61 Findings issued in 2001 to incorporate mitigation measures added or refined through the federal environmental review process. As a result, Massport amended its initial Section 61 Findings on October 21, 2004, to include mitigation measures required in FAA's ROD.
- In April 2007, FAA issued a ROD on the centerfield taxiway improvements based on its review of supplemental information.

Project Status

- Runway construction commenced in 2004. Runway 14-32 opened on November 23, 2006. The first full year of operation of Runway 14-32 was 2007.
- Realignment of the southwest corner taxiway system was completed in 2007.
- Taxiway D extension was completed in 2010.
- Taxiway N realignment remains under consideration for a future action.
- Reduction in approach minimums on Runway 15R and 33L were implemented in 2013 following completion of the 33L Light Pier replacement and FAA testing of new Instrument Landing System (ILS) equipment.

The Logan Airside Improvements Planning Project (**Figure 9-4**) involved the construction of a new unidirectional Runway 14-32 and centerfield taxiway, extension of Taxiway D, realignment of Taxiway N, improvements to the southwest corner taxiway system, and reduction in approach minimums on Runways 22L, 27, 15R, and 33L. Reduction in approach minimums on Runway 15R and 33L were approved in the EIS. However, implementation for approach minimum reductions depended upon realignment of the ILS. The construction impacts of relocating the ILS localizer and new Category III ILS equipment were addressed in the environmental review of the RSA enhancements for Runway 33L (EEA #14442). The Category III ILS began operations in 2013.

Table 9-5 summarizes the mitigation measures contained in the amended Section 61 Findings issued on October 21, 2004 and reports on the status of implementation. **Table 9-5** addresses only ongoing requirements, and it is noted when there are recent updates. Documentation on design and construction measures is provided in previous EDRs.

FIGURE 9-4 Logan Airside Improvements | **2018/2019 Environmental Data Report**

Note: Runway 14-32 construction completed in November 2006

◆ Improved Taxiways

● Reductions in Approach Minimums

0 500 1000 2000 Feet

Table 9-5 Logan Airside Improvements Planning Project (EEA #10458)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020)

Mitigation Measures	Status
Runway 14-32 Operations and Construction Mitigation	
Operational procedures for unidirectional Runway 14-32 will include over-water flight operations only, arrival operations in east-to-west direction from Runway 32 approach end, and departure operations from west-to-east direction from the Runway 14 departure end. Massport will enter into contract with appropriate government body and/or community group(s) to enforce intended unidirectional runway, if requested. Lighting, marking, and instrumental components of Runway 14-32 will be designed for a unidirectional runway. No parallel or other type taxiway facility will be constructed to allow east-to-west direction departures from the Runway 32 end. *The Federal Aviation Administration (FAA) endorsed the unidirectional limitations on Runway 14-32 and has agreed to develop air traffic control procedures to ensure safe and efficient operation of the unidirectional limitation, subject to variances that may be required to accommodate particular aircraft emergencies.*	**Implemented.** Runway 14-32 was constructed for unidirectional operation. All lighting, marking, and navigational instrumentation was constructed and is operated for unidirectional use only. There is no parallel or other type of taxiway facility that would facilitate east-to-west direction departures from the Runway 32 end. The construction mitigation measures were incorporated into the final design specifications and were implemented during construction. Runway 14-32 opened on November 23, 2006.
Wind-Restricted Use of Runway 14-32	
Restrict the use of Runway 14-32 to those times when winds are equal to or greater than 10 knots from the northwest or southeast (between 275 degrees and 005 degrees, or 095 degrees and 185 degrees, respectively).	**Implemented.** Massport provided initial data to support the FAA's effort. FAA implements the wind restriction in compliance with the federal Record of Decision (ROD).
Mitigation Policies/Programs	
Regional Transportation Policy	
Engage in promoting increased utilization of regional airports. *Cooperative transportation planning with the various transportation agencies to ensure an integrated regional transportation infrastructure (i.e., improved highways, public transportation, high-speed rail, private transportation services to improve regional airport access).*	**Implemented.** Please refer to Chapter 4, *Regional Transportation*, for updated information on regional transportation efforts.
Massport will continue to exercise operational control over Worcester Regional Airport.	**Implemented**. Massport exercised operational control over Worcester Regional Airport as part of its agreement with the City of Worcester, which went into effect on January 15, 2000. In April 2004, Massport and the City of Worcester agreed to a three-year extension of the Operating Agreement, extending Massport's operation of Worcester Regional Airport through June 2007. Subsequently, both parties agreed to a further extension. Legislation was passed in 2009 requiring Massport to assume ownership of Worcester Regional Airport. Massport's ownership of Worcester Regional Airport commenced on July 1, 2010.

Table 9-5 Logan Airside Improvements Planning Project (EEA #10458)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measures	Status
Regional Transportation Policy	
Massport will continue to attract new air service to Worcester Regional Airport.	**Implemented.** Massport works with carriers and makes other facility improvements to develop and sustain commercial service from Worcester. Massport already initiated a $100-million 10-year investment to revitalize and grow commercial operations at Worcester Regional Airport. As a result of this collaboration, jetBlue Airways has already handled over 600,000 passengers at Worcester Regional Airport since commencing operations in late 2013, serving two Florida destinations. Starting in May 2018, jetBlue Airways offers flights to John F. Kennedy International Airport in New York, New York. American Airlines began offering flights to Philadelphia International Airport starting October 2018. Delta Air Lines commenced service between Worcester and Detroit in the summer of 2019. As of October 2020, in response to COVID-19, all three airlines have temporarily suspended service in and out of Worcester Regional Airport.
Traveler and air service awareness will be provided to Worcester Regional Airport via marketing campaigns.	**Implemented.** Massport continues to aggressively market the Airport to potential commercial air service carriers. Massport worked with jetBlue Airways to begin service out of Worcester Regional Airport in November 2013. jetBlue Airways currently serves two Florida destinations from Worcester. jetBlue Airways recently commenced service between Worcester Regional Airport and John F. Kennedy International Airport in 2018. Delta Air Lines commenced service between Worcester and Detroit in the summer of 2019. As of October 2020, in response to COVID-19, all three airlines have temporarily suspended service in and out of Worcester Regional Airport.
Develop and maintain an aviation information database to include: aviation trend tracking reports for distribution to interested parties; statistical summaries of passenger levels, aircraft operations and airline schedule data at major New England regional airports; include a summary of regional airport trends and service developments in an Annual Report.	**Implemented.** Massport collects regional airport data. A summary of individual airport activity is published annually in the Environmental Data Reports (EDRs) and Environmental Status and Planning Reports (ESPRs).
Participate in other regional/state aviation forums.	**Implemented.** Please refer to Chapter 4, *Regional Transportation*, for updated information on regional transportation efforts.
Continue to work with FAA/regional airport directors to complete a New England Airports System Study to evaluate regional airports performance. FAA committed to work with other participants in the preparation of the study.	**Implemented.** The New England Regional Airport System Plan (NERASP) study was published in October 2006.

Table 9-5 Logan Airside Improvements Planning Project (EEA #10458)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measures	Status
Regional Transportation Policy	
Encourage transportation initiatives (i.e., commuter rail, rail or other links between regional airports) by relevant agencies or other governmental bodies through Transportation Bond Bill or other legislative initiatives to implement an improved effective regional transportation system.	**Implemented.** Massport continues to support regional transportation legislation and funding for other modes of transportation including the MBTA Silver Line and water transportation.
Continue to support inter-city rail planning through the Boston Metropolitan Planning Organization (MPO).	**Implemented.** Massport is an active member of the Boston MPO and contributes to the policy discussions in all modes of transportation.
Allow Massport's Logan Express satellite parking lots and stations available for third-party bus and park-and-ride connections to other regional airports, including Worcester, Manchester, and Providence.	**Implemented.** Upon request and review, Massport will continue to allow third party bus operators to provide service to regional airports from Logan Express facilities. In 2007, Massport enacted an agreement with Manchester-Boston Regional Airport to allow operation of a shuttle service between Manchester-Boston Regional Airport and the Anderson RTC in Woburn. That pilot program was replaced by hourly van service in 2008.
Sound Insulation	
Sound insulation is being provided within the Boston Logan Airside Improvements Planning Project Mitigation Contour including the affected residences of Chelsea, East Boston, Winthrop, and Revere. Through special project mitigations, FAA funding will be provided for residences with building code considerations to allow for the necessary upgrades thereby ensuring eligibility and participation in the sound insulation program. If FAA funding is unavailable to complete sound insulation to residences within the DNL 65 dB contour as a result of project implementation, Massport will provide the funding.	**Implemented.** Sound insulation was implemented in full compliance with state and federal regulatory requirements and mitigation commitments. Since 1986, Massport has sound insulated 5,467 residences, totaling 11,515 dwelling units. See Chapter 6, *Noise Abatement*, for additional details on sound insulation.
Preferential Runway Advisory System (PRAS)	
Massport will develop and implement a PRAS monitoring system and a new distribution system for reporting that will expand the contents of Massport's Quarterly Noise Reports and will involve the expansion of the distribution list to include the Logan Airport Citizens Advisory Committee (CAC). Runway utilization, dwell, and persistence reports will be included in the ESPR filings with the Massachusetts Environmental Policy Act (MEPA). Massport will continue to work with FAA to design additional reports to enhance the attainment of PRAS and Massport will begin to work with CAC to update PRAS. The current PRAS system will remain in place until superseded.	**Implemented.** Massport, the FAA, and the Logan Airport CAC initiated a noise study of Logan Airport. PRAS review and reporting was incorporated into the noise study. During Phase II of the ongoing Boston Logan Airport Noise Study (BLANS), the Logan Airport CAC voted to abandon PRAS because it had not achieved the intended noise abatement. Phase III of the BLANS focused on the development of an updated Runway Use Program. Operational tests of a new program began in November 2014 and continued through September 2016. The BLANS project ended in 2016 without the Logan Airport CAC agreeing on a new Runway Use Program. A final BLANS project report was issued in April 2017. For additional information, refer to Chapter 6, *Noise Abatement*. Runway utilization, dwell, and persistence reports continue to be included in the annual ESPR and EDR filings.

Table 9-5 Logan Airside Improvements Planning Project (EEA #10458)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measures	Status
Noise Abatement Study	
FAA has committed to undertake a noise abatement study that will include enhancing existing or developing new noise abatement measures applicable to aircraft overflight impacts, which will take into account environmental benefit, operational impact, aviation safety and efficiency, and consistency with applicable legal requirements. The scope of this study has been completed through the joint efforts of FAA, the CAC, and Massport as required by the ROD. Massport will work with the CAC and FAA to assess the existing PRAS at Logan Airport in accordance with Section 10.0 of the Section 61 Findings and will continue to participate in the noise study as contemplated in the ROD.	**Implemented.** The FAA, in conjunction with Massport and the Logan Airport CAC, initiated the Boston Overflight Noise Study (BONS). Phase I of the study, completed in early 2007, defined and sought to implement changes to flight tracks to minimize impacts from aircraft overflights, which do not require a detailed Environmental Assessment (EA). Federal funding for Phase II was requested early to ensure seamless continuation of the study and transition. Phase II of the BLANS was completed in 2012. It addressed additional noise abatement alternatives that will require detailed analysis to meet FAA environmental requirements. Massport is working with the Logan Airport CAC and the FAA on Phase III of the BONS Study to design a runway use plan for the Airport. The Logan Airport CAC could not agree on a runway use program and Phase III was completed in August 2012. A final BLANS project report was issued in April 2017.
Peak Period Monitoring and Demand Management Program (DMP)	
Massport will develop and implement a Peak Period Pricing (PPP) program or an alternative DMP. Massport will identify standards to allow airlines to accurately predict scheduling costs and modify accordingly. Massport will establish and maintain a monitoring system. *Massport will comply with its commitments with respect to PPP or alternate DMP. FAA has indicated in the ROD that it stands ready to assist Massport in this endeavor.*	**Implemented.** In July 2004, Massport filed a proposed rule with the Office of the Massachusetts Secretary of State to formally initiate the state rulemaking process and public review to establish a peak period surcharge during designated peak delay periods at Logan Airport. The public comment period ran through November 15, 2004, during which Massport conducted two public hearings. The Massport Board voted to establish the peak period surcharge program on January 16, 2005, and the program has been in place since then (see 740 CMR 27.03). Please refer to Appendix K, *Peak Period Pricing Monitoring Reports,* for additional details.
Single Engine Taxi Procedures	
Develop and implement a program designed to maximize the use of single engine procedures by all tenant airlines, consistent with safety requirements, pilot judgment and federal law requirements.	**Implemented.** Massport supports the use of single engine taxiing when it can be done safely, voluntarily, and at the discretion of the pilot. Massport is an active member of the FAA Partnership for Air Transportation Noise and Emissions Reduction (PARTNER) program on reducing noise and emissions. In 2009, Massport facilitated a more detailed survey of pilots at Logan Airport by the Massachusetts Institute of Technology (MIT) to better understand the use of single engine taxiing. MIT completed its survey and issued a paper in March 2010 (as provided in the *2010 EDR*). The MIT survey confirmed earlier Massport survey findings that single engine taxiing is an important operational measure used by airlines to conserve fuel and is extensively used at Logan Airport. In 2018 and 2019, Massport issued letters to air carriers in support of single engine taxiing when consistent with safety procedures. A copy of these letters is included in Appendix L, *Reduced/Single Engine Taxiing at Logan Airport Memoranda,* of this *2018/2019 EDR*.

Table 9-5 Logan Airside Improvements Planning Project (EEA #10458)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measures	Status
Report on Progress of Logan Transportation Management Association (TMA)	**Implemented.** Chapter 5, *Ground Access to and from Logan Airport,* discusses the Logan TMA and Massport efforts to increase high occupancy vehicle (HOV) access to Logan Airport. The continued focus is on broadening HOV options for all Logan Airport employees and actively participate in Transportation Demand Management (TDM) strategies. A local "Sunrise Shuttle" has been operating since 2007.

Source: Massport.
Note: The mitigation measures in *italics* are those that were referenced in FAA's ROD and later incorporated into the Section 61 Findings amended on October 21, 2004.

Southwest Service Area (SWSA) Redevelopment Program, EEA #14137

Permitting History

- Certificate on the Final EIR issued on May 28, 2010.
- Section 61 Findings submitted to EEA on June 29, 2010.

Project Status

Massport completed the major element of the SWSA program, the consolidated Rental Car Center (RCC) in 2014. In addition to customer service benefits, consolidation of the rental car operations and their shuttle buses into one coordinated operation has resulted in reduced VMT and reduced air emissions. See Chapter 5, *Ground Access to and from Logan Airport*, for additional information on VMT reductions.

Construction of enabling projects commenced in late summer of 2010 and final design of the facility continued through 2011. Although there was a phased opening, by the end of 2015, the project was completed and fully operational. Logan Airport's 21 compressed natural gas (CNG) buses and 32 clean diesel/electric buses have fully replaced the entire fleet of diesel rental car shuttle buses that previously served the individual rental car companies. An additional CNG bus was put into service in 2016, increasing the total to 22 CNG buses. The RCC was awarded Logan Airport's first LEED Gold certification in 2015.

Table 9-6 outlines Section 61 mitigation commitments of the SWSA Redevelopment Program, which Massport, the construction contractors, and the rental car companies have implemented as part of the design, construction, and operation of the facility. This project is now complete, and measures that were completed in the design and construction phase will no longer be tracked in the EDR/ESPR. The *2017 ESPR* presents the last full summary of those measures. Ongoing Section 61 commitments will continue to be updated annual, as appropriate.

Table 9-6 Southwest Service Area (SWSA) Redevelopment Program (EEA #14137)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020)

Mitigation Measure	Status
Noise Reduction Measures	
Eliminate individual rental car shuttle buses and combine Massport Airport Station buses (routes 22/33/55) through the Unified Bus System; thereby, reducing the overall number of rental car-related buses circulating on-Airport and associated noise.	**Implemented.** Massport purchased a new bus fleet which was put into operation in 2012. The new bus fleet, comprising 21 compressed natural gas (CNG) buses and 32 clean diesel/electric buses, has fully replaced the entire fleet of diesel rental car shuttle buses with the Rental Car Center (RCC) opening in 2013. One additional CNG bus was put into service in 2016, increasing the total from 21 to 22 buses.
Airport Transportation System Improvements	
Reduce the rental car shuttle bus fleet by approximately 70 percent through the creation of the Unified Bus System when compared to the 2007 Existing Condition and future No-Build/No-Action Conditions.	**Implemented.** Massport purchased a new Unified Bus Fleet of diesel/electric hybrid and CNG buses. The initial buses were put into operation in 2012. Full implementation of the new bus fleet occurred when the RCC opened in the fall of 2013.
Reduce rental car shuttle bus terminal curbside congestion through the creation of the Unified Bus System resulting in reduced emissions.	**Implemented** upon project opening. Massport purchased a new Unified Bus Fleet which was put into initial operation in 2012.
Utilize clean- and low-emission fuel for the Unified Bus System to further reduce emissions.	**Implemented** upon project opening. Massport has purchased a new Unified Bus Fleet. The new fleet is comprised of diesel/electric hybrid and CNG buses.
Install Intelligent Transportation System features, as part of the Unified Bus System to further reduce emissions and improve operational efficiency.	**Implemented** upon project opening. Massport purchased a new Unified Bus Fleet which was put into initial operation in 2012.
Implement new wayfinding signage to increase the efficiency of the circulating vehicles within and around the SWSA.	**Implemented** upon project opening.
Pedestrian and Bicycle Facilities	
Provide new pedestrian and bicycle facilities, including secure and covered bicycle storage at the Customer Service Center (CSC) and QTA buildings for employees, customers, and the general public, as well as shower/changing facilities within the QTA buildings for employees.	**Implemented.**
Provide enhanced pedestrian connections to and from the SWSA, airport terminals, the Logan Office Center, Memorial Stadium Park, Bremen Street Park, the Harborwalk, on-Airport buses, public transit (Massachusetts Bay Transportation Authority (MBTA) Airport Station), along Porter Street, and surrounding East Boston neighborhoods.	**Implemented.**
Provide street and pedestrian-level lighting and advanced warning signals and/or systems at crosswalks.	**Implemented.**
Transportation Demand Management (TDM) Plan	
Provide limited SWSA employee parking on-site.	**Implemented.**
Provide new access to public transit through the Unified Bus System (direct connection to MBTA Blue Line at Airport Station) and new/enhanced pedestrian facilities at the station.	**Implemented.**

Table 9-6 Southwest Service Area (SWSA) Redevelopment Program (EEA #14137)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Transportation Demand Management (TDM) Plan	
Require rental car companies to participate in the Logan Transportation Management Association (TMA).	**Implemented.** This requirement is included in the RCC tenant leases.
Alternative-Fuel Vehicles	
The rental car companies would provide fuel-efficient and/or alternative-fueled rental vehicles (quantity to be determined by the rental car companies).	**Implemented.** This requirement is included in the RCC tenant leases.

Source: Massport.
Note: The mitigation measures in *italics* are those that were referenced in FAA's ROD, and later incorporated into the Section 61 Findings as amended on June 29, 2010.

Logan Airport Runway Safety Area (RSA) Project – EEA #14442

Permitting History

- Certificate on the Final EA/EIR issued on March 18, 2011.
- FAA issued a FONSI on April 4, 2011, which documents that the proposed federal action is consistent with the National Environmental Policy Act of 1969 (NEPA) and other applicable environmental requirements and will not significantly affect the quality of the human environment with the mitigation requirements referenced in **Table 9-7**.
- Section 61 Findings were submitted to EEA on May 27, 2011 and published in the *Environmental Monitor* on June 8, 2011.
- Certificate on the Notice of Project Change (NPC) for the replacement of the Runway 33L approach light pier was issued on March 9, 2012.
- On April 12, 2012, the FAA found that the replacement of the Runway 33L approach light pier was a Categorical Exclusion and thus exempt from further consideration under NEPA.

Project Status

- Runway 33L RSA construction commenced in June 2011 and was completed in November 2012.
- Replacement of the Runway 33L approach light pier commenced in July 2012 and was completed in November 2012. The upgraded Category III system was put in service in 2013.
- The Runway 22R improvements were completed in 2014.

As described in previous EDRs/ESPRs, Massport has periodically undertaken RSA improvements and other safety improvements on the Logan Airport airfield. Massport completed safety improvements for Runways 22L, 4L/4R, and 27 under EEA #5122. In 2005, undertook safety improvements at Runway 22R with the construction of an Engineered Materials Arresting System (EMAS) bed at the end of the runway in compliance with FAA directives,

although no MEPA review was needed. In 2006, as part of a separate project, Massport installed an EMAS bed at the Runway 33L End. This project considered further safety enhancements to the Runway 33L and Runway 22R RSAs. Massport prepared a combined Environmental Assessment (EA) in accordance with NEPA and an Environmental Impact Report (EIR) in accordance with MEPA for the proposed enhancements at the Runway 33L and Runway 22R RSAs. The ENF was filed with MEPA on June 30, 2009, and the Draft EA/EIR was submitted to the FAA and EEA on July 15, 2010. The Final EA/EIR was submitted to the FAA and EEA on January 31, 2011. **Figure 9-5** shows the location of RSA projects at Logan Airport.

The Runway 33L RSA improvements include a 600-foot long RSA with an EMAS bed, portions of which are on a 460-foot long by 300-foot wide pile-supported deck extending over Boston Harbor. Additional elements of the RSA improvements include two emergency access ramps located on either side of the deck and relocation of the perimeter access road. Construction of the pile-supported deck was completed in November 2012.

The Runway 33L RSA project replaced the inner 500 feet of the existing light pier. As construction progressed on the Runway 33L RSA improvements, Massport determined that it would be feasible to replace the remaining Runway 33L approach light pier. In the summer of 2012, Massport began replacing approximately 1,900 feet of the existing timber light pier that extends approximately 2,400 feet southeast of Runway End 33L. The existing timber pier was replaced with a new concrete structure along the runway centerline, approximately 10 feet south of the old pier, using concrete pilings. The in-kind replacement reduced the total number of pilings significantly (from over 500 to approximately 150). As part of the reconstruction, the new light pier was also constructed to accommodate upgraded navigational aids. The pier improvements provide the infrastructure necessary to support navigational aids that facilitate implementation of the reduced aircraft approach minimums previously reviewed and approved by the FAA in a ROD dated August 2, 2002, for the Logan Airside Improvements Planning Project (Airside Project) (EEA #10458). Massport filed an NPC with MEPA for the proposed light pier replacement on January 31, 2012. On March 9, 2012, the Secretary of the EEA issued an NPC Certificate determining that no further MEPA review was required for the light pier replacement. On April 12, 2012, the FAA found that the replacement of the Runway 33L approach light pier was eligible for a Categorical Exclusion and thus exempt from further review under NEPA.

The Runway 22R improvements that were completed in 2014 enhanced the existing RSA at this location by constructing an ISA similar to the ISA constructed at the Runway 22L end. Construction of the Runway 22R ISA is completed. **Table 9-7** lists the Section 61 mitigation commitments for the Logan Airport RSA Project and Massport's progress in achieving these measures.

FIGURE 9-5 Runway End Safety Improvements | **2018/2019 Environmental Data Report**

◆ Runway End Safety Improvements

0 500 1000 2000 Feet

Table 9-7 Logan Airport Runway Safety Area Improvement Program (EEA # 14442) Section 61 Mitigation Commitments to be Implemented (as of October 31, 2020)

Mitigation Measure	Status
Protected Resources	
Eelgrass (Runway-End 33L Only)	
Develop a mitigation program that will replace lost eelgrass area and functions by creation of new eelgrass, at a 3:1 replacement to loss ratio.	**Implemented.** Eelgrass was transplanted in 2011, but did not survive through 2012. In 2013, state and federal agencies agreed that Massport's implementation of a conservation mooring program would be a suitable replacement alternative to the initial eelgrass transplant. In 2015, Massport completed the replacement of nearly 240 traditional moorings, located in eelgrass habitat, with conservation moorings. The moorings are located in Boston and four other Commonwealth harbors. Under contract to Massport, the Massachusetts Division of Marine Fisheries (MassDMF) conducted monitoring of the installations in 2014, 2015, 2016, 2017, and 2018. MassDMF completed the fifth and final monitoring report in 2019; the final report was filed in the spring of 2020.
Salt Marsh (Runway-End 22R Only)	
Restore new salt marsh at a 2:1 replacement to loss ratio.	**Implemented** as part of Runway 22R habitat mitigation at Rumney Marsh. Construction was completed in 2016.
Monitor compensatory salt marsh for success and invasive plant species, and implement an invasive species control plan.	**Implemented** upon completion of Runway 22R habitat mitigation at Rumney Marsh in 2017. Annual monitoring and agency reporting continues.
Shellfish	
Monitor pilings and substrate at Runway 33L.	**Implemented.** Monitoring was conducted in the summers of 2013, 2014, 2015, and 2017. Based on the 2017 monitoring report, the Massachusetts Department of Environmental Protection (MassDEP) determined that this mitigation commitment had been satisfied and that no further monitoring is required.
Restore approximately 1.1 acres of habitat.	**Implemented** as part of habitat mitigation at Rumney Marsh.
Harvest and transplant shellfish from the footprint of the Runway 22R Inclined Safety Area (ISA).	**Not Implemented.** MassDMF identified a risk of shellfish disease in the Logan Airport flats, including Runway 22R, and determined that the shellfish should not be relocated.
Execute Memorandum of Agreement (MOA) with the Massachusetts Division of Marine Fisheries for resource enhancement.	**Implemented.** A MOA with MassDMF was executed on July 30, 2012 and all requirements of the MOA have been implemented.
State-Listed Rare Species	
Identify equivalent area of pavement for removal to maintain area of available habitat at Logan Airport for the upland sandpiper if required by the Massachusetts Natural Heritage and Endangered Species Program.	**Implemented.** The Massachusetts Natural Heritage and Endangered Species Program (NHESP) determined that construction time-of-year restrictions will avoid impacts to state-listed species. The seasonal restrictions were implemented in 2018 during construction of Taxiway C-1.

Source: Massport.
Note: The mitigation measures in *italics* are those that were referenced in FAA's ROD and later incorporated into the Section 61 Findings as amended on May 27, 2011.

Terminal E Modernization – EEA #15434

Permitting History

- Certificate on the ENF issued on December 16, 2015.
- Certificate on the Draft EIR issued on September 16, 2016.
- Certificate on the Final EIR issued on November 10, 2016
- FAA FONSI/ROD issued on November 14, 2016.
- Section 61 Findings approved on January 19, 2017.

Project Status

The Terminal E Modernization Project will add seven new gates to Terminal E (three of which were already approved under MEPA in 1996 but were never constructed). The existing concourse, terminal core, and terminal roadway frontages (collectively, the "Project") will also be extended. Implementation of the project will better accommodate the current and projected increased demand for international travel that is expected to occur whether or not the Project is implemented.

Initial construction on the project began in 2019. To accommodate this initial phase of construction, a replacement Logan Gas Station was constructed in the SWSA along Jeffries Street. In June 2020, the construction program was adjusted in response to the COVID-19 pandemic and resulting passenger and revenue declines. The current plan is to complete and initially open four gates before continuing towards completion of the remaining three gates. An update on a schedule to complete the remaining three gates and covered pedestrian connection the Blue Line Airport Station will be provided in the next EDR; currently, Phase II of the project is deferred.

Figure 9-6 shows the location of the Terminal E Modernization Project. **Table 9-8** lists each of the Section 61 mitigation commitments for the Terminal E Modernization Project and Massport's progress in achieving these measures. To date, Massport has provided three status reports to the FAA (May 2018, April 2019 and February 2020. Future EDRs and ESPRs will provide updates, as available.

FIGURE 9-6 Terminal E Modernization Project | **2018/2019 Environmental Data Report**

◆ Terminal E Modernization Project - EEA #15434

0 500 1000 2000 Feet

Table 9-8 Terminal E Modernization Project (EEA #15434)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020)

Mitigation Measure	Status
Overall Project Benefits	
Provide pedestrian access between Terminal E and Massachusetts Bay Transportation Authority (MBTA) Airport Blue Line-Station.	Upon completion of the project, a covered pedestrian connection between Terminal E and the MBTA Blue Line Airport Station will be constructed to improve passenger convenience. Various approaches are under consideration and will be further documented in subsequent environmental filings and EDR/ESPRs.
Construct roadway and curb improvements to improve vehicle flow, high occupancy vehicle (HOV) access, and reduce air and GHG emissions.	Final design is being advanced consistent with the commitments in the Final Environmental Assessment (EA)/Environmental Impact Report (EIR).
Site Terminal E additions so as to buffer the adjacent neighborhoods from aircraft noise.	Final design is being advanced consistent with the commitments in the Final EA/EIR.
Seek Leadership in Energy and Environmental Design (LEED®) certification at Silver level or better; meet or exceed Massachusetts (MA) LEED Plus program goals.	Final design is being advanced consistent with the commitments in the Final EA/EIR.
Provide 400 Hz of power and pre-conditioned air at the new aircraft gates.	400 Hz power and preconditioned air will be installed at the new gates when constructed.
Site Planning and Sustainable Design/Greenhouse Gas Reduction	
Incorporate sustainable design in design, construction, and operations including:	Final design is being advanced consistent with the commitments in the Final EA/EIR.
▪ *Improved building envelope*	Final design is being advanced consistent with the commitments in the Final EA/EIR.
▪ *Improved Air Handling Units;*	Final design is being advanced consistent with the commitments in the Final EA/EIR.
▪ *Efficient water loops*	Final design is being advanced consistent with the commitments in the Final EA/EIR.
▪ *Reduced interior lighting power density*	Final design is being advanced consistent with the commitments in the Final EA/EIR.
▪ *Specify roofing materials with a minimum reflectance rating of 0.70 and emittance value of at least 0.75 for a minimum of 75% of the available roof area. Install non-glare roofing materials.*	Final design is being advanced consistent with the commitments in the Final EA/EIR.
▪ *Incorporate infrastructure for collection, storage, and handling of recyclable materials.*	Final design is being advanced consistent with the commitments in the Final EA/EIR.

Table 9-8 Terminal E Modernization Project (EEA #15434)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
▪ *Require contractor to develop a construction waste management plan that requires diversion or reduction of construction waste by at least 75%.*	Final design is being advanced consistent with the commitments in the Final EA/EIR.
▪ *Establish a project-specific goal for sourcing materials extracted, harvested, recovered, and or manufactured within New England.*	Final design is being advanced consistent with the commitments in the Final EA/EIR.
▪ *Design project to achieve energy efficiencies of a minimum of 20% below the MA Energy Code.*	Final design is being advanced consistent with the commitments in the Final EA/EIR.
▪ *Include water conservation devices that reduce water use by 20% below code.*	Final design is being advanced consistent with the commitments in the Final EA/EIR.
▪ *Include a minimum of 25,000 square feet of roof top solar photovoltaic system (approximately 300kW). Heat restroom hot water with solar units.*	Final design is being advanced consistent with the commitments in the Final EA/EIR. The Terminal E expansion includes a planned 300,000-kilowatt hour (kWh) rooftop solar array.
▪ *Incorporate occupancy sensors in all indoor areas to reduce electrical demand.*	Final design is being advanced consistent with the commitments in the Final EA/EIR.
▪ *Evaluate other energy efficiency/greenhouse gas reduction measures as project design progresses.*	Final design is being advanced consistent with the decisions on these measures, as recorded in the Final EA/EIR.
Air Quality	
Reduce operational-related carbon dioxide (CO_2) emissions associated with the Project by a minimum of 30% percent.	Final design is being advanced consistent with the commitments in the Final EA/EIR.
Stormwater Management	
Replace and upgrade stormwater management.	Final design is being advanced consistent with the commitments in the Final EA/EIR.
Construction Period Impacts	
In accordance with DEP's Clean Air Construction Initiative, the Authority will require that construction contractors to install emission control devices such as diesel oxidation catalyst and/or particulate filters on certain equipment types (i.e., front-end loaders, backhoes, excavators, cranes, and air compressors).	**Implemented.** These measures are being incorporated during construction.
Retrofitting of certain construction equipment types with emission controls such as diesel oxidation catalyst and/or particulate filters.	**Implemented.** These measures are being incorporated during construction.

Table 9-8 Terminal E Modernization Project (EEA #15434)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Selection of high efficiency "temporary" space heating /cooling systems.	**Implemented.** These measures are being incorporated during construction.
Remediate subsurface contamination, as necessary, if encountered during tank removals or other excavation activities as part of construction (in compliance with the Massachusetts Contingency Plan).	**Implemented.** These measures are being incorporated during construction.
Soil treatment and reuse on site as part of a Soil Management Plan.	**Implemented.** These measures are being incorporated during construction.
Voluntary compliance with the requirements of City of Boston noise ordinances, including restrictions on the types of equipment that can be used, and limitations on the hours when certain activities can take place (the City of Boston noise ordinance establishes restrictions during the construction hours between 7:00 PM and 7:00 AM).	**Implemented.** These measures are being incorporated during construction.
Construction worker vehicle trip limitation, including requiring contractors to provide off-Airport parking and use of high-occupancy vehicle transportation modes for employees.	**Implemented.** These measures are being incorporated during construction.
Implement Indoor Air Quality (IAQ) Management Plan during construction.	**Implemented.** These measures are being incorporated during construction.
Construction Traffic Operations	
Construction-related traffic will be required to access and egress through the North Gate using only state and federal highways and the Airport roadway network. Construction- related traffic on local East Boston roadways will be prohibited.	**Implemented.** These measures are being incorporated during construction.
Construction Traffic Operations	
Construction employee parking spaces will not be permitted on the construction site nor will provisions be made for them elsewhere on-Airport with the exception of a small number of spaces for supervisory personnel. The Authority will require contractors on this Project to implement construction worker vehicle trip management measures, including requiring off-Airport parking and HOV transportation modes for contractor employees.	**Implemented.** These measures are being incorporated during construction.
Police details will be employed, as needed, to manage traffic and ensure public safety.	**Implemented.** These measures are being incorporated during construction.
Construction Air Quality	
Construction emissions will be reduced and controlled by mandatory contractor implementation of the following best practices:	**Implemented.** These measures are being incorporated during construction.

Table 9-8 Terminal E Modernization Project (EEA #15434)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Construction Air Quality	
Encouragement for construction-worker site access/egress using dedicated buses and vans;	**Implemented.** These measures are being incorporated during construction.
Reduction of exposed erodible surface areas to the extent feasible;	**Implemented.** These measures are being incorporated during construction.
Covering of exposed surface areas with pavement or vegetation in an expeditious manner and periodic watering;	**Implemented.** These measures are being incorporated during construction.
Minimizing equipment idling times;	**Implemented.** These measures are being incorporated during construction.
Reduction of on-site vehicle speeds;	**Implemented.** These measures are being incorporated during construction.
Ensuring contractor implementation of appropriate fugitive dust and equipment exhaust controls;	**Implemented.** These measures are being incorporated during construction.
Use of low- or zero-emissions equipment to the maximum extent feasible; and	**Implemented.** These measures are being incorporated during construction.
Use of covered haul trucks during materials transportation.	**Implemented.** These measures are being incorporated during construction.
Construction Noise	
Require construction equipment to deploy noise-reduction measures, such as the use of proper mufflers, measures to limit noise from truck traffic. Primarily operate only during daylight hours (7:00 AM to 7:00 PM).	**Implemented.** These measures are being incorporated during construction.

Logan Airport Parking Project – EEA #15665

Permitting History

- Certificate on the ENF issued on May 5, 2017.
- Certificate on the Draft EIR issued on August 2, 2019.
- Certificate on the Final EIR issued on January 30, 2020

Project Status

The Logan Airport Parking Project includes the construction of 5,000 new commercial parking spaces in structured parking facilities at two on-Airport sites, both of which are currently used for parking. Approximately 2,000 spaces will be sited in a new garage on existing surface parking lots in front of Terminal E and approximately 3,000 spaces will be accommodated at the Economy Garage through an expansion of the existing facility.

The project is consistent with the recently amended Logan Airport Parking Freeze (310 CMR 7.30), which allows for the increase of up to 5,000 on-Airport commercial parking space and will help Massport meet the parking needs of its users. The project will reduce vehicle miles traveled and associated air emissions at Logan Airport by increasing the quantity of available on-Airport parking. The project aims to decrease the number of private vehicles that access the Airport via environmentally undesirable drop-off/pick-up modes, which generate up to four vehicle trips per passenger compared to two vehicle trips for passengers who drive and park.

The project is being phased with the first 2,000 spaces to be constructed in a new garage atop the surface parking lot across from Terminal E (Phase I). Phase II will consist of the additional 3,000 spaces at the Economy Garage.

Both phases of this project are currently deferred due to the COVID-19 pandemic. An updated schedule for this project will be included in upcoming EDRs, as available. **Figure 9-7** shows the location of the Logan Airport Parking Project. **Table 9-9** lists each of the Section 61 mitigation commitments for the Logan Airport Parking Project and Massport's progress in achieving these measures.

FIGURE 9-7 Logan Airport Parking Project | **2018/2019 Environmental Data Report**

◆ Logan Airport Parking Project EEA #15665

Phase I Terminal E
Phase II Economy Garage

0 500 1000 2000 Feet

Table 9-9 Logan Airport Parking Project (EEA #15665)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020)

Mitigation Measure	Status
Overall Project Benefits	
Accommodate existing and anticipated air passenger demand for parking to reduce drop-off/pick-up mode share and associated vehicle miles travelled (VMT) and on-Airport and off-Airport air emissions	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds. The new parking spaces will be constructed to reduce drop-off/pick-up mode share and associated vehicle miles travelled (VMT) and on-Airport and off-Airport air emissions.
Reuse existing developed areas (i.e., the Project sites avoid undeveloped, greenfield lands).	Both project sites (surface parking lot in front of Terminal E and the Economy Garage) are fully developed and currently in use for parking.
Selecting project sites with community input that are in areas already used for parking, are on existing bus/shuttle routes, and are separated from nearby residential communities	Both project sites (surface parking lot in front of Terminal E and the Economy Garage) were selected with community input. They are on existing bus/shuttle routes and are separated from nearby residential communities.
Providing added noise barrier benefits in conjunction with the Terminal E Modernization Project, through the expansion of the existing Economy Garage.	When constructed, the additional levels on the Economy Garage will provide additional community noise buffering from airside noise sources.
Providing dynamic signage/messaging, parking reservation system, and parking guidance via electronic space occupancy detection to reduce on-Airport circulation as well as associated VMT and air emissions.	Final design will include these measures to reduce on-Airport circulation as well as associated VMT and air emissions.
Sustainability and Resiliency	
Incorporating measures from the U.S. Green Building Council's Parksmart rating system into the project's technology, structural design, and operation	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.
Reducing lighting power densities from a base of 0.19 watts per square foot to a maximum of 0.05 watts per square foot.	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.
Installing occupancy sensors and photocells on all applicable interior and exterior lighting	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.
Installing programmable thermostats where applicable (i.e., mechanical/electrical rooms)	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design proceeds.
Designing the parking decks to be open air, negating the need for ventilation systems	All new parking spaces will be open air.
Performing building commissioning in accordance with ASHRAE Guideline 0-2005 and ASHRAE Guideline 1.1-2007	Building commissioning will follow these procedures.

Table 9-9 Logan Airport Parking Project (EEA #15665)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Sustainability and Resiliency	
Incorporating a solar photovoltaic (PV) system at the new garage in front of Terminal E capable of offsetting 50 percent of the facility's total energy consumption	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.
Relocating the existing solar PV system at the new garage in front of Terminal E capable of offsetting 50 percent of the facility's total energy consumption, including all lighting and power required for its electric vehicle (EV) charging stations	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.
Reserving parking spaces for alternative fuel vehicles (e.g., EVs) amounting to at least 1 percent of total spaces and assigning preferred parking spaces for other low-emitting and fuel-efficient vehicles amounting to at least another 1 percent of total spaces	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.
Installing 11 EV charging stations (22 ports) in the new garage in front of Terminal E.	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.
Designing and building the proposed garages to accommodate expanded EV charging infrastructures to accommodate 150 percent of demand	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.
Integrating vertical landscaping into the façade of the new garage in front of Terminal E	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.
Adhering to durable design principles and a preventative maintenance plan to extend facility lifespan and avoid greenhouse gas emissions caused by future large-scale construction and renovation activities	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.
Installing and applying only no- or low-volatile organic compound (VOC) coatings, paints, and sealants	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.
Installing halon-free fire suppression systems in each garage	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.

Table 9-9 Logan Airport Parking Project (EEA #15665)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Sustainability and Resiliency	
Complying with Massport's Floodproofing Design Guide and elevating critical equipment and systems above the designated design flood elevations	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.
Implementing an active recycling program to reduce the amount of waste sent to regional landfills/incinerators and to reduce greenhouse gas emissions associated with material disposal	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.
Displaying educational materials to convey the facilities' environmentally sustainable design and operations	The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds.
Construction Period Mitigation	
Providing on-Airport storage areas for construction materials	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.
Coordinating the arrival of large construction equipment among various on-Airport projects and limiting their arrival or removal during peak travel hours (both Airport and commuter peaks)	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.
Developing specific truck routing and/or staging plans for implementation by the various contractors	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.
Requiring construction managers to prepare: - *Draft Soil Management Plan* - *Draft Stormwater Pollution Prevention Plan* - *Draft Management Plan for Dewatering, if needed* - *Draft Health and Safety Plan*	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.
Employing a Construction Waste Management Plan that requires at least 85 percent of materials to be recycled or reused	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.
Controlling rodents through routine inspection, monitoring, and treatment	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.
Prioritizing the use of construction equipment and materials that are repurposed, reused, or recycled (or contain recycled content), where feasible	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.

**Table 9-9 Logan Airport Parking Project (EEA #15665)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)**

Mitigation Measure	Status
Construction Period Mitigation	
Prioritizing construction equipment and materials that are sourced regionally (i.e., within 300 miles of the Project sites) to reduce greenhouse gas emissions associated with their transport	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.
Using regional (i.e., within 75 miles) labor to the greatest extent practicable	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.
Encouraging construction companies to provide off-Airport parking for their employees and to provide shuttle services from these locations (shuttles are required to use the Coughlin Bypass road to access the Airport)	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.
Requiring all construction vehicle/equipment to follow anti-idling procedures and all construction managers to provide associated training	These measures will be implemented during project construction.
Requiring the use of low- or zero-emissions equipment, where practicable	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.
Requiring the retrofitting of appropriate diesel construction equipment with diesel oxidation catalyst and/or particulate filters	These measures will be implemented during project construction.
Requiring contractors to use Ultra Low Sulfur Diesel Fuel (ULSD)	These measures will be implemented during project construction.
Maintaining low on-site vehicle speeds	These measures will be implemented during project construction.
Deploying air quality and fugitive dust management best practices, such as reducing exposed erodible surface areas through appropriate materials and equipment staging, covering exposed surface areas with pavement or vegetation in an expeditious manner, and stabilizing soil with cover or periodic watering	These measures will be implemented during project construction.
Using and maintaining construction equipment appropriately to avoid unnecessary noise and applying noise-reduction measures to reduce noise from pile driving by at least 5 A-weighted decibels (dBA) below their unmitigated levels 1	These measures will be implemented during project construction.

Table 9-9 Logan Airport Parking Project (EEA #15665)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Construction Period Mitigation	
Requiring trucks to access the Project sites by Route 1A, Interstate 90, Coughlin Bypass road, and the main Airport roadway only or other routes in compliance with transportation safety requirements	These measures will be implemented during project construction.
Prohibiting trucks from using local streets	These measures will be implemented during project construction.
Specifying truck routes in contractors' construction specifications	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.
Using concrete production and batching plants with access via Route 1A or Interstate 90	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.
Encouraging construction workers to use Massachusetts Bay Transportation Authority (MBTA) transit services, Logan Express, the water shuttle, and other high-occupancy modes of travel	These measures will be implemented during project construction.
Putting into place an Erosion and Sedimentation Control Program, in compliance with the Stormwater Pollution Prevention Plan, to protect water quality and to minimize construction phase impacts to Boston Harbor	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.
Deploying spill prevention measures and sedimentation controls throughout the construction phases to prevent pollution from construction equipment and erosion	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.
Using the following erosion and sedimentation controls throughout the construction phases: - *Perimeter barriers such as straw wattles or compost-filled "silt sock" barriers will be placed around upland work areas to trap sediment transported by runoff before it reaches the drainage system or leaves the construction site* - *Existing catch basins within the work sites will be protected with barriers (where appropriate) or silt sacks* - *Open soil surfaces will be stabilized within 14 days after grading or construction activities have temporarily or permanently ceased*	These measures will be included in the Phase I construction specifications. Additional details on Phase II construction will be outlined when that proceeds.

Table 9-9 Logan Airport Parking Project (EEA #15665)
Details of Ongoing Section 61 Mitigation Measures (as of October 31, 2020) (Continued)

Mitigation Measure	Status
Ground Access Improvement, Trip Reduction, and Emissions Reduction	
Implement the following ground access improvement, trip reduction, and emission reduction initiatives: - *Advance the electrification of ground service equipment, pursuant to which all ground service equipment will be replaced no later than the end of 2027 (as available)* - *Expand Logan Express capacity by 10 percent* *Increase the percentage of zero emission taxi, livery, and Ride App vehicles (i.e., those associated with companies such as Uber and Lyft) by providing: high-speed electric vehicle charging stations at all taxi, livery, and Ride App pools; and taxi and Ride App queue priority to electric vehicles (subject to negotiation with companies)*	Work on these initiatives moved forward in 2019. The Logan Airport Parking Project is currently deferred due to the COVID-19 pandemic. Design is currently on hold and mitigation measures will follow when design and implementation proceeds. The next EDR will provide additional updates.

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MEPA Appendices

- Appendix A, MEPA Certificates and Responses to Comments
- Appendix B, Comment Letters and Responses
- Appendix C, Proposed Scope for the *2020 EDR*
- Appendix D, Distribution

A

MEPA Certificates and Responses to Comments

- Secretary of the Executive Office of Energy and Environmental Affairs Certificate on the *Logan Airport 2017 Environmental Status and Planning Report (ESPR)* and Massport's Responses to Comments raised in the Certificate.
- Secretary of the Executive Office of Energy and Environmental Affairs Certificate on the *Logan Airport 2016 EDR Notice of Project Change*.
- Copies of the Secretary of the Executive Office of Energy and Environmental Affairs Certificates issued for the reporting years 2016, 2015, 2014, 2012/2013, and 2011.
- Copy of the Secretary of the Executive Office of Energy and Environmental Affairs Certificate issued for the Terminal E Modernization Project Environmental Notification Form.
- Copy of the Secretary of the Executive Office of Energy and Environmental Affairs Certificate issued for the Terminal E Modernization Project Draft Environmental Assessment/Environmental Impact Report.
- Copy of the Secretary of the Executive Office of Energy and Environmental Affairs Certificate issued for the Terminal E Modernization Project Final Environmental Assessment/Environmental Impact Report.
- Copy of the Secretary of the Executive Office of Energy and Environmental Affairs Certificate issued for the Logan Airport Parking Project Environmental Notification Form.
- Copy of the Secretary of the Executive Office of Energy and Environmental Affairs Certificate issued for the Logan Airport Parking Project Draft Environmental Impact Report.
- Copy of the Secretary of the Executive Office of Energy and Environmental Affairs Certificate issued for the Logan Airport Parking Project Final Environmental Impact Report.

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Secretary of the Executive Office of Energy and Environmental Affairs Certificate on the *Logan Airport 2017 Environmental Status and Planning Report (ESPR)* and Massport's Responses to Comments raised in the Certificate

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The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
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November 25, 2019

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
2017 LOGAN AIRPORT ENVIRONMENTAL STATUS AND PLANNING REPORT

PROJECT NAME	: 2017 Environmental Status and Planning Report (ESPR)
PROJECT MUNICIPALITY	: Boston/Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: August 7, 2019

As Secretary of the Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Status and Planning Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (MEPA) (M.G.L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00).

The environmental review process for Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become, consistent with the objectives of the MEPA regulations, part of the Massachusetts Port Authority's (Massport) long-range planning process. The ESPR provides a "big picture" analysis of the environmental impacts associated with current and projected activity levels, and presents a comprehensive strategy to minimize impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific Environmental Impact Reports (EIRs). The ESPR is generally updated on a five-year basis. The

previous ESPR for the year 2011 was filed in April of 2013. Environmental Data Reports (EDRs) are filed in the years between ESPRs. The EDR is a retrospective document that is filed annually and identifies environmental impacts based on actual passenger activity and operations. The 2017 ESPR is the subject of this review. This 2017 ESPR follows the 2016 EDR and reports on 2017 and future conditions. In addition, Massport has requested to combine both the 2018 EDR and the 2019 EDR into one document referred to as the 2018/2019 EDR. I have considered and granted this request. This Certificate also contains a Scope for the 2018/2019 EDR. A-1

I have received comments from elected officials and municipalities including State Representative Adrian Madaro, State Senator Walter Timilty, State Representative RoseLee Vincent, Boston City Councilor Lydia Edwards, the Town of Winthrop's Board of Health, and the Selectboard of the Town of Milton. Comments were also submitted by municipalities, environmental advocacy groups, community organizations, and residents. The 2017 ESPR acknowledges that passenger activity has continued to grow faster than forecasts provided in the 2016 EDR and the previous 2011 ESPR. The majority of comment letters note that actual passenger growth has outpaced previous projections and identify concerns that measures to mitigate resulting noise, air quality, and transportation impacts have not been provided commensurate with the increased growth. Comments also identify concerns that the projected passenger growth rate underrepresents future conditions and associated impacts. A-2 Comments from State Representative Adrian Madaro, State Representative RoseLee Vincent, the Conservation Law Foundation (CLF), Airport Impact Relief Incorporated (AIR Inc.), the Town of Milton, and others request that Massport develop and analyze a higher passenger and aircraft growth scenario based upon actual growth rates. Comments also request that Massport present more direct information about the major research findings around health and airport impacts, including likely pollution and noise health impacts, and commitments from Massport for the reduction of and mitigation of these impacts. A-3

In addition to responding to these comments, the 2018/2019 EDR should report on the progress and other refinements for tracking noise, traffic, and air emissions and abatement efforts, as further described in the Scope below. A-4 The 2018/2019 EDR will document potential impacts and trends and propose measures to avoid, minimize and mitigate environmental impacts. Should actual growth in passenger and/or aircraft operations outpace the forecasts, I expect that additional information will be provided in future EDRs. Specifically, the EDR(s) should explain the circumstances that caused the growth, describe how this may affect the impact forecasts, and identify mitigation and policy strategies that will be implemented to address the proportional growth in impacts. Furthermore, I reserve the right to require that future ESPRs evaluate the impacts of a range of activity forecasts, based on the results of the interim reporting provided in the EDRs. A-5

<u>Logan Airport Environmental Review and Planning</u>

The ESPR is generally responsive to the Scope. It contains useful data on activity levels and impacts, and lays out a forecast for trends in the future years. The technical studies in the 2017 ESPR include reporting on, and analysis of, key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management,

and project mitigation tracking. This 2017 ESPR focuses on: (1) rapidly growing domestic and international passenger demand; (2) the formal introduction of transportation network companies (TNC), such as Uber and Lyft, to Logan Airport and subsequent effects; (3) airport-wide emissions including those associated with vehicle trips; (4) use of the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT) for noise and air quality modeling; and, (5) noise abatement strategies.

In 2017, passenger activity at Logan Airport continued to grow faster than previous forecasts. Air passenger activity levels at Logan Airport reached an all-time high of 38.4 million in 2017, an increase of 5.9 percent over what was projected in the 2016 EDR. Aircraft operations increased to a total of 401,371 in 2017, an increase of 2.6 percent over 2016. This trend continued in 2018 with air passenger activity levels of 40.9 million and aircraft operations totaling 424,024. The growth is directly correlated to the strong national and regional economies and an increase in demand for international air service. Massport has responded to this demand for international air by providing new service to international destinations and expanding service to existing destinations. As passenger levels have increased, aircraft operations remain significantly below the peak of 507,449 operations experienced in 1998 when Logan Airport served 26.5 million passengers. The reduction of over 100,000 annual flight operations, combined with the transition towards newer and larger aircraft with improved environmental performance and operational efficiencies, have supported passenger growth while limiting environmental impacts.

Although environmental impacts are significantly lower compared to 1998 when operations were highest, comparison of activity level and environmental impact data to the 2016 EDR identifies incremental increases in noise exposure, air emissions and traffic. These increases were not forecast in the previous 2011 ESPR. The current passenger forecast is higher by approximately 10 million passengers, or 26 percent higher, than the previous 2011 ESPR planning forecast of 39.8 million passengers. The 2017 ESPR forecast for aircraft operations (486,364) is approximately 2.5 percent higher than the 2011 ESPR operations forecast (474,734). These increases are associated with passenger growth, changes in flight patterns, and changes in modeling of noise and air quality. The 2017 ESPR indicates that terminals, roadways, and parking facilities are strained by these increases and identifies on-Airport improvements to relieve on-Airport roadway congestion and accessibility.

Logan Airport passenger ground access is changing rapidly with the use of TNCs for departures and arrivals at the Airport. Massport began collecting TNC data in 2017 when TNCs were authorized to pick up customers from the airport. The 2017 ESPR provides data and identifies effects of TNCs and provides an assessment of ground access trends.

The most significant change since the previous 2011 ESPR is the introduction by the FAA of changes to area navigation (RNAV) procedures. The RNAV program has been implemented throughout the country and its primary purpose is to increase safety and operational efficiency. The implementation of several of these procedures has resulted in concentrations of flight patterns over certain communities and significant increases in noise exposure. The impact of the RNAV program is emphasized in comment letters received on the 2017 ESPR and during review of specific projects, including the Terminal E Modernization Project (EEA# 15434).

Massport and the FAA signed a Memorandum of Understanding (MOU) in 2017 to frame a new process for analyzing opportunities to incrementally reduce noise through changes or amendments to Performance Based Navigation (PBN), including RNAV procedures. The 2017 ESPR provided an update on this process and described Massport's efforts to mitigate noise exposure and impacts.

The 2017 ESPR provides information on noise conditions modeled using the latest FAA noise modeling software, the Aviation Environmental Design Tool (AEDT). Massport transitioned to AEDT from the Integrated Noise Model (INM) in its 2016 EDR. The 2017 ESPR also uses FAA's AEDT model for emission factors compared to the legacy Emissions and Dispersion Modeling System (EDMS) model. Massport attributes some of the changes in air emissions to the use of the AEDT model, which assumes higher nitrogen oxides emission factors compared to the legacy EDMS model.

Review of the 2017 ESPR and Scope for the 2018/2019 EDR

The 2017 ESPR identifies the cumulative impacts of passenger growth and associated ground and aircraft operations based on revised forecasts; analyzes trends and environmental impacts of operations in calendar year 2017 and provides projections for the next 10 to 15 years; and provides updates on projects, environmental management plans, and the status of project mitigation.

The 2018/2019 EDR must include information on the environmental policies and planning that form the context of environmental reporting, technical studies, and environmental mitigation initiatives against which projects at Logan Airport can be evaluated. This should include identification of the cumulative effects of Logan Airport operations and activities. The results of the Logan Airport Air Passenger Ground Access Survey and the Long-term Parking Management Plan should inform transportation planning and strategies to achieve the high occupancy vehicle (HOV) mode share goal. A-6

The 2018/2019 EDR must include copies of all ESPR and EDR Certificates and a distribution list (indicating those receiving documents, CDs, or Notices of Availability). Supporting technical appendices should be provided as necessary. A-7

Response to Comments

The Response to Comments section should address all of the substantive comments on the 2017 ESPR, and other Certificates for Logan Airport that reference EDR/ESPR documentation (e.g. Logan Airport Parking Project, Terminal E). To ensure that the issues raised by commenters are addressed, the 2018/2019 EDR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended to, and shall not be construed to, enlarge the scope of the EDR beyond what has been expressly identified in this Certificate. The Responses to Comments should not reference a section of the EDR unless they are directly responsive to the comment. Common themes that should be addressed A-8

throughout the EDR and in the Responses to Comments include noise (modeling of noise contours and noise abatement) and emissions reduction issues. The EDR should include sufficient information to address comments on traffic, air quality, and public health, which are common concerns of commenters. A-8

Activity Levels

Air traffic activity levels at Logan Airport are the basis for the evaluation of noise, air quality, and ground access conditions associated with the Airport. In this section, current activity levels at the Airport are compared to prior-year levels, and historical passenger and operations trends at Logan Airport dating back to 2000 which is the year Massport approved an Environmental Management Policy. The total number of aircraft operations at Logan Airport increased for a total of 401,371 in 2017, an increase of 2.6 percent over 2016. Aircraft operations remain well below the 487,996 operations in 2000 and the historic peak of 507,449 operations reached in 1998. The slower growth in aircraft operations compared to passenger levels is due to the steady increase in aircraft size and improving aircraft load factors (passengers/available seats). Air carrier efficiency continued to improve in 2017 as the average number of passengers per aircraft operation at Logan Airport grew from 92.8 in 2016 to 95.7 in 2017. The increasing number of passengers per flight reflects a shift away from smaller aircraft and rising load factors as airlines continue to focus on capacity control and improvements in efficiency. This trend is indicative of the industry-wide shift toward higher aircraft load factors and an increase in the number of domestic and international destinations.

Logan Airport is considered an origin and destination airport both nationally and internationally, meaning that approximately 90 percent of Logan Airport passengers either start or end their trip in the New England area. According to the 2017 ESPR, international passenger levels increased at a faster rate than domestic passenger levels in 2017. Domestic air passenger activity levels increased by 5.1 percent while international air passenger activity levels increased by 9.3 percent over 2016 levels. The 2017 ESPR indicates that strong international passenger growth was driven by the economic attractiveness of the metropolitan Boston region and the strength of Boston as an origin and destination market. In response to regional demand for international service, new non-stop services were introduced by a number of airlines including Air Berlin, Norwegian Air Shuttle, Qatar Airways, Scandinavian Airlines, and TAP Air Portugal. New international destinations from Logan Airport in 2016 included Dusseldorf, London Gatwick, Doha, Copenhagen, and Lisbon.

The 2017 ESPR also updates the Logan Airport long-term passenger forecast to reflect growth trends at Logan Airport and revised expectations for the local/national/international economy. It addresses methodologies and assumptions used in the analysis, including anticipated changes to fleet mix and other trends in the aviation industry.

Passenger activity has continued to grow faster than forecasts provided in the 2016 EDR and the previous 2011 ESPR. In 2017, air passenger activity levels at Logan Airport reached 38.4 million, an increase of 5.9 percent over 2016. The 2017 passenger level represents a record high for Logan Airport. The ESPR projects that Logan Airport will reach 50 million annual passengers in the next 10 to 15 years (the Future Planning Horizon). This 2017 ESPR evaluates

future operational and environmental conditions associated with this increase in passenger activity. This level of air passengers is forecast to be accommodated in approximately 486,000 annual aircraft operations. The 2017 ESPR indicates that the analysis provided for Massport's forecast is consistent with the FAA's Terminal Area Forecast (TAF) that states within the 10- to 15-year planning horizon, the FAA forecasts 50 million annual air passengers at Logan Airport.

The 2017 ESPR provides a description on how Massport will achieve long-standing goals to reduce overall operating and environmental impacts at the airport as passengers and, in particular, international passengers increase. With this growth comes challenges, and Massport has to develop strategies to address these challenges in a manner that will allow Logan Airport to evolve in a sustainable and environmentally-responsible way. If this passenger level is reached sooner, Massport needs to ensure mitigation is being provided commensurate with increased growth and associated impacts. Passenger activity reached an all-time high in 2017 and the ESPR indicated this growth continued into 2018, with 40.9 million air passengers. According to the ESPR, this peak follows unprecedented, consistent growth since 2013 at a 6.2 percent annual average growth, making Logan Airport one of the fastest growing airports in the US in terms of passenger activity levels. The projection of 50 million annual air passengers in the next 10 to 15 years represents an average annual growth rate of 1.5 percent. While I understand that growth at Logan Airport can be attributed to the strong local, regional, and national economies, many comments identify concerns that Massport may reach 50 million annual passengers much sooner than the projected 10 to 15 year timeframe. I expect that additional information will be provided in future EDRs if actual growth in passenger and/or aircraft operations outpace the forecasts, including a discussion of passenger and activity levels and planning/mitigation to address impacts of the growth. I reserve the right to require that future ESPRs evaluate a range of activity forecasts based on the results of this interim reporting. I also expect that air and noise emissions related to passenger and activity levels and planning/mitigation will be a significant emphasis of the 2018/2019 EDR. A-9

To improve accessibility to the Airport as well as to relieve on-Airport roadway congestion, Massport proposes to enhance HOV and Logan Express facilities, implement on-Airport roadway and Massachusetts Bay Transportation Authority (MBTA) Blue Line/intra-terminal connectivity projects, construct a consolidated transportation network company (TNC, such as Uber and Lyft) drop-off and pick-up area, and construct new parking facilities, which will help reduce the number of drop-off/pick-up trips. The 2018/2019 EDR should report on the effectiveness of the TNC management plan and provide an update on planned and executed measures to relieve on-Airport roadway congestion. A-10

The 2018/2019 EDR should also report on:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
- Domestic and international passenger activity levels;
- Cargo and mail volumes;
- Comparison of 2018/2019 operations and passenger activity levels to 2017 activity levels; and
- National aviation trends compared to Logan Airport trends.

Sustainability at Logan Airport

The 2017 ESPR describes Massport's airport wide sustainability goals as identified in its International Organization for Standardization (ISO) 14001 Environmental Management System (EMS) and Sustainability Management Plan (SMP). In 2015, Massport completed the Logan Airport SMP through a grant awarded by the FAA. The SMP is integrated with the existing EMS framework to promote environmental, social, and economic improvement. The SMP identifies efforts to promote, coordinate, and integrate sustainability initiatives Airport-wide. Progress towards achieving these goals is addressed in the 2017 ESPR. The 2017 ESPR also describes the Annual Sustainability and Resiliency Report, released in April 2018. The report highlights achievements and progress toward Massport's sustainability goals and targets since the release of the SMP in 2015 and the publication of the Annual Sustainability Report in 2016. Massport has achieved three sustainability targets for energy use per square foot, energy use per passenger, and greenhouse gas (GHG) emissions per passenger. The 2018/2019 EDR should provide updates to airport wide sustainability goals. A-11

Climate Change

Massport assets and Logan Airport, in particular, are critical infrastructure and play an important role in the economy. As recognized in Governor Baker's recent Executive Order (EO) 569 "Establishing an Integrated Climate Change Strategy for the Commonwealth" and a suite of other state and municipal initiatives, the impacts of climate change must be an important consideration for development across the state. Climate change presents a serious threat to the environment and the Commonwealth's residents, communities, and economy. The EO indicates that extreme weather events associated with climate change present a serious threat to public safety and the lives and property of our residences.

The EO also identifies the transportation sector as a significant contributor to GHG emissions in the Commonwealth and the only sector in which GHG emissions are increasing. In 2017, EEA and the Massachusetts Department of Transportation (MassDOT) conducted a number of transportation listening sessions throughout the Commonwealth to inform development of strategies and programs to reverse the growth in this sector. The 2017 ESPR addresses Massport's consistency with EO 569, the Massachusetts State Hazard Mitigation and Climate Adaptation Plan, and the Massachusetts Energy Plan.

GHG emissions

The 2017 ESPR incorporates GHG emissions reporting consistent with that provided in the 2016 EDR which was normalized to support effective review and analysis. The 2017 ESPR includes only conditioned (heated and cooled, enclosed buildings) building areas in energy use and emission intensity calculations, reports input energy components (oil, gas, electricity) and central plant data, and clarifies how renewables are accounted for in the analysis. The 2017 ESPR contains a GHG emissions inventory for the Logan Airport which presented emissions and energy data normalized by passenger use and building area. The GHG emissions associated with buildings and transportation were presented as pounds of carbon dioxide (CO_2) per passenger.

Energy use for buildings were presented as Kilo British Thermal Units (kBtu) per square foot (sf) per year. The analysis showed that Massport has reduced emissions per passenger across its operations by 39 percent from 2007 to 2017. Building energy use has been reduced 23 percent while building emissions have been reduced 44 percent from 2007 to 2017.

The 2017 ESPR quantifies GHG emissions for aircraft, ground support equipment (GSE), motor vehicles, and stationary sources using emission factors and methodologies outlined in the *Greenhouse Gas Emissions Policy and Protocol* issued by EEA and the Transportation Research Board's *Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories* (Airport Cooperative Research Program (ACRP) Report 11, Project 02-06). The 2017 ESPR compares the results of the 2017 GHG emissions inventory to the 2016 EDR results. Total GHG emissions increased from 2016 to 2017 by about 8 percent due primarily to the increase in aircraft operations. Total emissions of GHG in the Future Planning Horizon are predicted to be about 23 percent higher than 2017 levels predominantly due to the predicted increase in aircraft operations. Specifically, this is attributable to the forecasted approximate 21 percent increase in aircraft operations and 31 percent increase in passenger traffic, each resulting in an increase in fuel usage and vehicle miles traveled (VMT). The Future Planning Horizon Massport-related emissions are expected to represent about 10 percent of total GHG emissions at the Airport. Tenant-based emissions are anticipated to represent about 71 percent; electrical consumption from Massport, common areas, and tenants are anticipated to represent about 7 percent; and passenger vehicle emissions are anticipated to represent about 12 percent of total GHG emissions.

The 2018/2019 EDR should incorporate GHG emissions reporting consistent with that provided in the 2017 ESPR which was normalized to support effective review and analysis. In addition, Massport should ensure that only conditioned (heated and cooled, enclosed buildings) building areas are included in energy use and emission intensity calculations, report input energy components (oil, gas, electricity) and central plant data, and clarify how renewables are accounted in the analysis. I encourage Massport to consider the recommendations identified in comments from the Department of Energy Resources (DOER) which recommend electrification of space and water heating as well as evaluation of opportunities for distributed renewable energy generation. Massport should consult with the MEPA Office and the DOER regarding presentation of GHG data in the 2018/2019 EDR. A-12

The 2018/2019 EDR GHG emissions should continue to be quantified for aircraft, GSE, motor vehicles, and stationary sources using emission factors and methodologies outlined in the *Greenhouse Gas Emissions Policy and Protocol* issued by EEA and the Transportation Research Board's *Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories* as developed for the 2017 ESPR. The results of the 2018/2019 GHG emissions inventory should be compared to the 2017 results. A-13

Adaptation and Resiliency

The 2017 ESPR details the resiliency program developed by Massport to identify critical infrastructure and to enhance its resiliency. As reported in the Logan Airport 2018 Annual Sustainability and Resiliency Report included in the 2017 ESPR, approximately 60 percent of

critical assets (electrical power, diesel fuel pumping stations, telecommunications systems, and public safety) have been protected from storm surge flooding via relocation, and/or raising in elevation, exceeding the 2020 resiliency target of 25 percent. A particular concern for Massport is the effect of sea level rise and projected increases in the severity and frequency of storms. At the end of 2013, in recognition of the potential effects of climate change on Massport infrastructure and operations, Massport initiated a Disaster and Infrastructure Resiliency Planning (DIRP) Study for Logan Airport. The DIRP Study includes a hazard analysis, modeling sea-level rise and storm surge, and projections of temperature, precipitation, and anticipated increases in extreme weather events. The DIRP Study provides recommendations regarding short-term strategies to make Massport's facilities more resilient to the effects of climate change. In addition to the DIRP Study and its related initiatives, Massport has completed an Authority-wide risk assessment; issued a Floodproofing Design Guide (which was updated in April 2016); and developed a resilience framework to provide consistent metrics for short- and long-term planning and protection of its critical facilities and infrastructure. The 2017 ESPR provides a summary of the DIRP Study and identifies which recommendations Massport will implement in the short term and long term. The 2018/2019 EDR should continue to identify which recommendations will be implemented by Massport to improve resiliency. A-14

The effects of climate change, such as extreme heat, may exacerbate the negative health effects of air pollution. As the effects of climate change progress, I encourage Massport to consider its ability to reduce negative air quality effects as a matter of public health, and to work with community-based organizations to collaboratively determine how to further mitigate air quality impacts. As discussed below in greater detail, the 2018/2019 EDR should report on findings around health and airport impacts in relation to emissions, as well as measures to reduce these impacts. A-15

Mitigation

The 2017 ESPR provides an update on Massport's mitigation commitments under the MEPA for projects at Logan Airport for which an Environmental Impact Report (EIR) was filed and state Section 61 Findings were committed in order to document that all feasible measures have been taken to avoid or minimize impacts. The 2017 ESPR addresses cumulative, Airport-wide impacts. The 2017 ESPR also updates the status of mitigation commitments for recent projects such as the Terminal E Modernization Project and the Logan Airport Parking Project as well as projects previously included in the EDRs.

The 2018/2019 EDR should continue to report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review. It should update the status of Massport's mitigation commitments and also identify projects for which mitigation is complete. A-16

Planning

The Airport Planning section describes the status of projects underway or completed at Logan Airport by the end of 2017. Specific topics include terminal area projects, service area projects, buffer/open space projects, Airport parking projects, airside area projects, HOV improvements, and Airport-wide projects. Project updates include:

- *Terminal E Renovation and Enhancements Project*: This project includes interior and exterior improvements at Terminal E to accommodate regular service by wider and longer Group VI aircraft. The project reconfigured three gates to accommodate Group VI aircraft (including the Airbus A380 and Boeing 747-8 primarily used by international air carriers) and passenger holdrooms to accommodate larger passenger loads associated with these aircraft. Construction was completed in early 2017.

- *Terminal E Modernization Project*: This project will accommodate existing and long range forecasted demand for international service. The expansion will add the three gates approved in 1996 (International Gateway West Concourse project, EEA #9791), which were never constructed, and four additional new gates in an extended concourse. A key feature of this project is the first direct pedestrian connection from the MBTA Blue Line Airport Station to the terminal complex at Logan Airport. It will also include roadway improvements to facilitate access to the terminal.

- *Terminal C to E Airside Connector:* This project provides a new post-security connection between Terminals C and E on the Departures Level and provides improved passenger circulation within the post-security concourses, additional holdroom space at Terminal E, reconfigured office space, concessions and concessions support, and a new consolidated location for escalators and stairs. The project was completed in May 2016.

- *Terminal B Airline Optimization Project:* Massport is upgrading its facilities on the Pier B side of Terminal B to meet airlines' needs (primarily reflecting the merger of American Airlines and US Airways) and to provide facilities that improve the passenger traveling experience. Similar improvements have been implemented with the recent renovations and improvements at Terminal B, Pier A. Planned improvements include an enlarged ticketing hall; improved outbound bag area; and expanded bag claim hall, concession areas, and holdroom capacity at the gate. Final design is complete and construction is underway. Construction was completed in 2019.

- Massport is also planning improvements to Terminal A, including interior upgrades in the main terminal and satellite terminal, enhanced passenger amenities, reconfiguration and improvements at the security checkpoint, and a feasibility study of post-security connection between Terminal A and Terminal B, and Terminal A and Terminal E.

- *Logan Airport Parking Project*: This project includes the construction of up to 5,000 new commercial parking spaces to reduce trip generation associated with increases in passenger drop-off and pick-up at the airport. The Certificate on the Draft Environmental Impact Report (DEIR) was issued on August 2, 2019 and included a Scope for the Final Environmental Impact Report (FEIR). The project required an amendment to the Logan Airport Parking Freeze Regulations (310 CMR 7.30). Amendments to the regulations were promulgated in 2017. During the review of the 2017 ESPR Massport released three studies to identify ways to further support alternative transit options to and from the Airport, which the amended Parking Freeze regulations required Massport to complete. The results of these studies will inform Massport's future long-range planning efforts to

reduce air passenger-related VMT and associated air emissions which will extend the associated air quality benefits of this project.

- In addition to the planned roadway improvements as part of the Terminal C Building, Roadway and Curb Enhancements, Terminal E Modernization, and Logan Airport Parking Projects, Massport is considering other possible infrastructure modifications. Several options are being considered to reduce on-Airport congestion and improve on-Airport ground access efficiency, including dedicated HOV bus lanes, the creation of an intermodal transportation center with bus service to terminals, and the construction of an Automated People Mover (APM).

- *Maintenance of Airport Edge Buffer Areas and Parks:* The 2017 ESPR provides updates on the planning, construction, and maintenance of four Airport edge buffer areas and two parks along Logan Airport's perimeter. As of 2017, the Bayswater Buffer, Navy Fuel Pier Buffer, SWSA Buffer Phase 1 and the SWSA Buffer Phase 2 have been completed. These buffers and parks include 3.3 miles and more than 33 acres of green space developed or managed by Massport.

The 2018/2019 EDR should continue to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport must accommodate and guide tenant development. The EDR should describe the status of planning initiatives for the following areas: A-17

- Roadways and Airport Parking;
- Terminal Area;
- Airside Area;
- Service and Cargo Areas;
- Airport Buffers and Landscaping; and,
- Energy, Sustainability, and Resiliency.

The 2018/2019 EDR should also indicate the status of long-range planning activities, including the status of public works projects implemented by other agencies within the boundaries of Logan Airport. The 2018/2019 EDR should identify the status and assess the effectiveness of ground access changes, including roadway and parking projects, that consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on streets in adjacent neighborhoods. A-18

<u>Regional Transportation</u>

The 2017 ESPR describes activity levels at New England's regional airports and provides an update on regional planning activities, including long-range transportation efforts. The New England region is anchored by Logan Airport and a system of 10 other commercial service, reliever, and general aviation (GA) airports (regional airports). In 2017, passenger traffic at the New England airports represented the highest passenger traffic level for the region since the economic downturn in 2008. In 2017, the total number of air passengers utilizing these 11 New

England commercial service airports increased by 5.5 percent, from 51.9 million air passengers in 2016 to 54.7 million passengers in 2017.

The 2018/2019 EDR should report on: A-19

Regional Airports

- 2018 and 2019 regional airport operations, passenger activity levels, and schedule data within an historical context;
- Status of plans and new improvements as provided by the regional airport authorities;
- Regional economic factors;
- Role of the Worcester Regional Airport and Hanscom Field in the regional aviation system and Massport's efforts to promote these airports; and
- Ground access improvements at Massachusetts Regional Airports.

Regional Transportation System

- Massport's role in managing the regional aviation facilities;
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
- Report on metropolitan and regional rail initiatives and ridership.

<u>Ground Access to and from Logan Airport</u>

The 2017 ESPR reports that average daily traffic and VMT on Airport roadways has increased in 2017 compared to 2016. The 2017 ESPR provides data on transit ridership, roadways, traffic volumes, and parking. Specifically, the ESPR states that Massport has continued to invest in and operate Logan Airport with a goal of increasing the number of passengers arriving by transit or other HOV modes. The 2017 ESPR provides a discussion of ground access modes and trip generation associated with each mode including: (1) transit and shared-ride HOV services; (2) drive to Logan Airport and park; or (3) drop-off/pick-up mode, which can involve a private vehicle, taxi, limousine, or TNCs.

Average weekday on-Airport VMT increased by about 11 percent from approximately 176,840 in 2016 to 196,500 in 2017. The change in average daily traffic can be attributed primarily to the increases in air passenger activity, passenger drop-off/pick-up, cargo, and non-aviation related Airport uses. Additionally, the use of mobile application ride-booking services, such as Uber and Lyft, are increasingly becoming a mode of choice for ground access at Logan Airport. TNCs were estimated to contribute about 15,000 vehicle trips per day. TNCs are impacting other access modes to the Airport and contributing to on-Airport congestion. Partially due to the emergence of TNCs, black car limousines and scheduled van ridership dropped by 40 percent from 2016 to 2017. Taxi dispatches declined 18 percent and MBTA Blue Line ridership decreased by 2 percent in 2017 compared to 2016. The 2017 ESPR does not present a quantifiable comparison between VMT values prior to 2011 because the previous model was limited to terminal access roads while the current VMT model includes a larger on-Airport study area. Massport has proposed to construct a consolidated TNC drop-off and pick-up area and implement a TNC management plan to encourage shared rides and reduce gateway congestion.

Massport remains in compliance with the Parking Freeze regulations which regulates the number of commercial and employee parking spaces allowed at Logan Airport. As required, Massport submits semi-annual filings to the Massachusetts Department of Environmental Protection (MassDEP) to demonstrate compliance with the Logan Airport Parking Freeze. The full reports for 2017 are included in the 2017 ESPR. As permitted (and encouraged) by the regulations, Massport has converted employee spaces to commercial spaces, within the overall limits. In 2017, the Logan Airport Parking Freeze was amended to allow for an increase of up to 5,000 on-Airport commercial parking spaces, which allows for the construction of additional parking to reduce drop-off/pick up modes and alleviate constrained on-Airport parking conditions. MassDEP issued the amended regulation on June 30, 2017, approving the requested Parking Freeze increase. On December 5, 2017, the U.S. Environmental Protection Agency (EPA) proposed a rule approving the revision of the Massachusetts SIP incorporating the amended Logan Airport Parking Freeze. The final rule was issued on March 6, 2018 and became effective on April 5, 2018.

The 2017 ESPR describes a multi-pronged trip reduction strategy to reduce the number of private vehicles that access Logan Airport and, in particular, the drop-off/pick-up modes. Measures implemented in 2017 by Massport to increase HOV use include a blend of initiatives related to pricing (incentives and disincentives), service availability, service quality, marketing, and traveler information. The 2017 ESPR introduced a new definition for HOV modes. In the 2016 EDR and previous documents, Massport identified all taxis and TNCs as non-HOV and all black car limousines as HOV. The 2017 ESPR will estimate HOV and non-HOV breakdowns for taxis, livery services, and TNCs based on whether there is more than one passenger. Consistent with the directive identified in the Certificate for the Logan Airport Parking Project, and through negotiations with the CLF, Massport has committed to a goal of 35.5 percent HOV by 2022 and 40 percent by 2027.

The Airport-wide Automated Traffic Monitoring System (ATMS) includes permanent traffic count stations at the Airport's gateway roadways. These stations provide data on annual average daily traffic (AADT), annual average weekday daily traffic (AWDT), and annual average weekend daily traffic (AWEDT). The AADT (entering and departing Logan Airport) increased by 4.1 percent between 2016 and 2017. The change in average daily traffic can be attributed to: an 5.9-percent increase in air passenger activity in 2017; the impact of TNCs, which generated approximately 15,000 vehicle trips per day; and an increase in drop-off/pick-up activity by private and commercial automobiles.

The 2017 ESPR describes improvements to support HOV access which include: Back Bay Logan Express service (since May 2014); free boarding of the MBTA Silver Line outbound (from Logan Airport); a 1,100-car parking garage at the Framingham Logan Express; reduced holiday travel parking rates at Logan Express facilities; increased parking rates on the Airport; and support for private coach bus and van operators. Logan Express passenger ridership from suburban park-and-ride locations increased by over 6 percent from 2016 to 2017 and overall service increased by about 1 percent. The 2017 identified a continued decrease in ridership to and from Back Bay Logan Express, which has been a noted trend since the MBTA's Government Center Station reopened.

In the next 10 to 15 years Logan Airport is anticipated to reach 50 million air passengers. While the 2017 ESPR above discusses strains placed on the Airport's roadway infrastructure at 2017 levels (38.4 million passengers) the 2018/2019 EDR is an opportunity to commit to further reducing congestion and associated emissions by increasing HOV ridership, reducing TNC deadheading activity (empty one-way trips), increasing on-Airport parking to reduce drop-off/pick-up, and expanding Logan Express service and facilities. The 2018/2019 EDR should provide an expanded mitigation package to address the transportation impacts associated with increased passenger activity should actual passenger growth outpace the forecasts. A-20

The 2018/2019 EDR should report on 2018 and 2019 ground access conditions at the airport and provide a comparison to 2017 for the following:

- Description of compliance with Logan Airport Parking Freeze;
- High-occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Water Transportation, and Logan Express);
- Logan Airport Employee Transportation Management Association (Logan TMA) services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport vehicle miles traveled (VMT); A-21
- Parking demand and management (including rates and duration statistics);
- Status of long-range ground access management strategy planning and the connection to the Massachusetts Bay Transportation Authority (MBTA) Airport Station associated with the planned Terminal E Modernization;
- Project, anticipated MBTA ridership, and possible changes in HOV mode share; and
- Trends of transportation network companies (TNCs), such as Uber and Lyft, and their operations at Logan Airport.

The 2018/2019 EDR should address the following topics:

- Target HOV mode share and incentives;
- Impact of TNCs on Logan Airport landside operations and effectiveness of the TNC management plan;
- Update on parking conditions;
- Non-Airport through-traffic;
- Cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line, Silver Line, Water Transportation, and Logan Express; A-22
- Report on efforts to increase capacity and use of Logan Express;
- Progress on enhancing water transportation to and from Logan Airport;
- Results and recommendations of the ground access study Long-term Parking Management Plan required by the Parking Freeze amendments; and
- Strategies for enhancing services and increasing employee membership in the Logan Airport TMA.

Noise

The 2017 ESPR updated the status of the noise environment at Logan Airport in 2017, provided a projection of noise impacts for the Future Planning Horizon, and described Massport's efforts to mitigate noise exposure and impacts. As described below in greater detail, the implementation of the RNAV Pilot study being jointly undertaken by FAA and Massport has resulted in concentration of flight patterns over certain communities and significant increases in noise exposure. The effects of this program are identified as significant concerns in the majority of comment letters.

The 2017 ESPR provides noise modeling results from the AEDT. The model requires detailed operational data as inputs for noise calculations, including numbers of operations per day by aircraft type and by time of day, which runway is used for each arrival and for each departure, and flight track geometry for each track. The 2017 ESPR also presents summaries of the 2017 operational data used in the noise modeling, as well as the resultant annual Day-Night Average Sound Level (DNL) noise contours, a comparison of the modeled results with measured levels from the noise monitoring system, and estimates of the population residing within various increments of noise exposure in 2017.

Both FAA and the U.S. Department of Housing and Urban Development consider DNL exposure levels above 65 decibels (dB) to be incompatible with residential land use. Population exposed to DNL levels greater than or equal to DNL 65 dB noise levels increased by 483 people, from 7,450 in 2016 to 7,933 in 2017. Runway use changes from 2016 to 2017 were the largest factor influencing noise exposure in 2017. The one-month closure of Runway 4R-22L from May and June 2017 and its continued limited availability for arrivals into September 2017 are reflected in the noise contour changes presented in the 2017 ESPR. An additional factor influencing noise contour changes in 2017 was an increase in nighttime operations, from 55,499 in 2016 to 61,155 operations in 2017, an increase of 10.2 percent. The DNL 65 dB contour is projected to increase due to expected growth in operations in the next 10 to 15 year Future Planning Horizon projects. Therefore, the total number of people residing in the DNL 65 dB contour would also increase. The 2017 ESPR also provides the Future Planning Horizon DNL contours presented compared to 2017. The contours indicate that the total number of nighttime operations for the Future Horizon Planning forecast (an average nightly 167.75) will remain almost the same as in 2017, while the daytime operations are expected to grow from an average of 932 operations to 1,165 daily (25 percent increase). The 2017 ESPR states that the contours represent a conservative estimate of the future noise levels because Massport assumes the continued advancement in aircraft technology will result in quieter engines and actual lower noise levels in the future.

In 2017, noise complaints more than doubled. Massport received 59,343 noise complaints from 95 communities, a 56-percent increase from the 2016 total of 38,045 noise complaints from 83 communities. The increase in complaints continues to be primarily related to the FAA's RNAV departure procedures, which concentrate flight tracks along narrower corridors. All complaints have been forwarded to FAA. The 2017 ESPR also provides an update on the Memorandum of Understanding (MOU) between Massport and FAA to frame the process for analyzing opportunities to reduce noise through changes or amendments to Performance

Based Navigation (PBN), including RNAV. The 2017 ESPR also states that FAA and Massport are committing to: measure and model the benefits and impacts of changing some RNAV approaches; and, test and develop an implementation plan, which will include environmental analysis and community/public outreach.

The 2017 ESPR EDR identifies which noise abatement measures are being employed and reports on the status of the sound insulation program since 1990. To date, Massport has installed sound insulation in 5,467 residences, including 11,515 dwelling units, and 36 schools in East Boston, Roxbury, Dorchester, Winthrop, Revere, Chelsea, and South Boston. Eligibility for sound insulation must follow FAA guidelines which requires that the residence is located within the latest DNL 65 dB contour and interior noise levels within habitable rooms of noncompatible structures must be 45 dB or greater with the windows closed. The FAA will allow a residence to be treated under the sound insulation program one time; homes treated previously are not eligible for additional consideration.

The 2018/2019 EDR must provide strategies to address noise impacts which are expressed in numerous comments received on the 2017 ESPR. Massport should continue to implement and develop additional noise abatement measures, such as runway use restrictions and reduced-engine taxiing. Massport should also coordinate with stakeholders through the Massport Community Advisory Committee to identify opportunities to reduce noise. A-23

The 2018/2019 EDR should also provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2018 and 2019 conditions and provide a comparison to 2017 for the following:

- Fleet Mix, including Stage II, Recertified Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft; A-24
- Nighttime operations;
- Runway utilization (report on aircraft and airline adherence with runway utilization goals);
- Preferential runway advisory system (PRAS) tracking; and
- Flight tracks.

The 2018/2019 EDR should report on the following:

- Changes in annual noise contours and noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the models deployed;
- Cumulative Noise Index (CNI); A-25
- Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels; and
- Flight track monitoring noise reports.

The 2018/2019 EDR should also report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide an update on the noise and operations A-26

monitoring system. It should also report on the status of Block 1 and 2 of the RNAV Pilot Project, which will analyze the feasibility of changes to some of RNAV approaches and departures from Logan Airport. A-26

Air Quality/Emissions Reduction

The 2017 ESPR provided an overview of airport-related air quality issues in 2017, efforts to reduce emissions, and projections for Future Planning Horizon emissions. The air quality modeling is based on aircraft operations, fleet mix characteristics, and airfield taxiing times combined with GSE usage, motor vehicle traffic volumes, and stationary source utilization rates. The 2017 ESPR uses FAA's approved computer model for calculating emissions from aircraft-related sources AEDT model. The latest version of AEDT is 2d (AEDT 2d), which was released in February 2018. Total air quality emissions from all sources associated with Logan Airport are significantly lower than a decade ago. The 2017 ESPR identifies Massport's initiatives to improve air quality and reduce emissions, including: replacement of gas- and diesel-powered GSE with all-electric GSE (eGSE) by the end of 2027 (as commercially available); implementation of additional initiatives to increase HOV use, continue to reduce emissions from Massport fleet vehicles, and encourage use of alternative fuel vehicles; and implementation of energy efficiency projects, including upgrades to the Central Heating and Cooling Plant, and increasing the use of renewable energy, such as solar and wind installations.

Aircraft emissions continue to represent the largest source (94 percent) of nitrogen oxides (NOx) at Logan Airport. In 2017, total emissions of NOx increased by about 12 percent from 2016 to 2017. Modeled NOx emissions increased to 5,935 kg/day compared to 5,300 kg/day in 2016. The increase in NOx from 2016 to 2017 is almost entirely attributed to the forecasted increase in aircraft operations at the Airport coupled with the changing aircraft fleet (i.e., greater use of quieter, more fuel-efficient aircraft engines that overall result in fewer emissions with the exception of NOx) . Emissions of NOx are predicted to increase by about 37 percent in the Future Planning Horizon compared to 2017. The changes are also attributable to the FAA's AEDT model, which assumes higher NOx emission factors compared to the legacy Emissions and Dispersion Modeling System (EDMS) model. NOx emissions associated with GSE, motor vehicles, and stationary sources, many of which Massport has control or influence, have declined from 2016 to 2017. As stated previously in this Certificate, GHG emissions also increased from 2016 to 2017 by about 8 percent due primarily to the increase in aircraft operations. Total emissions of GHG in the Future Planning Horizon are predicted to be about 23 percent higher than 2017 levels predominantly due to the predicted increase in aircraft operations.

Total modeled emissions of carbon monoxide (CO), particulate matter (PM10/PM2.5), and volatile organic compounds (VOCs) have decreased from 2016 to 2017 by about 4 percent, 20 percent, and less than 1 percent, respectively, even though aircraft operations have increased over the same time period. Specifically, total modeled emissions of VOCs decreased in 2017 to 1,273 kilograms (kg)/day, compared to 1,280 kg/day in 2016. Total modeled CO emissions decreased in 2017 to 7,092 compared to 7,350 kg/day in 2016. Total PM10/PM2.5 emissions have decreased to 77 kg/day in 2017 compared to 96 kg/day in 2016. The 2017 ESPR projects that total emissions of CO, PM10/PM2.5, and VOCs will decrease in the Future Planning Horizon by about 2 percent, 10 percent, and 8 percent, respectively, compared to 2017 levels.

The projected reduction in emissions is attributed to a combination of the conversion of GSE to viable electric alternatives, lower motor vehicle emissions due to greater efficiency, cleaner aircraft engine technologies, and changes in aircraft fleet mix.

The 2018/2019 EDR should contain an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The 2018/2019 EDR should also provide discussion of progress on national and international levels to decrease air emissions. A-27 Massport should continue to use the FAA's AEDT model for air emissions modeling as was presented in the 2017 ESPR. The 2018/2019 EDR should provide enhanced mitigation related to air emissions to address the potential of 50 million air passengers and increased activity levels if this level of growth is attained prior to the Future Planning Horizon timeframe. A-28

The EPA Motor Vehicle Emission Simulator (MOVES) tool should continue to be used to assess vehicular emissions on airport roadways. The 2018/2019 EDR should include a mobile sources emissions inventory for CO, NOx, VOCs, and PMs. It should also report on Massport and tenant alternative fuel vehicle programs and the status of Logan Airport air quality studies undertaken by Massport or others, as available. A-29 The 2018/2019 EDR should demonstrate that Massport's programs to maintain and increase HOV modes provide the capacity to meet demand associated with growth. The 2018/2019 EDR should also provide an update on its efforts to encourage the use of single engine taxiing under safe conditions.

Commenters continue to express concern regarding ultrafine particulates (UFPs). The 2017 ESPR includes information on the status of UFP review by the Environmental Protection Agency (EPA) and an update on associated and monitoring. The 2018/2019 EDR should include an update on this information. It should also provide an update on the status and the findings of UFP research being performed by Tufts University and Boston University regarding the identification of airport-specific related UFPs in an urban environment. The 2018/2019 EDR should present more direct information about the major research findings around health and airport impacts in relation to emissions, including likely pollution and noise health impacts, and commitments from Massport for the reduction and mitigation of these impacts. A-30

Since October 2014, as a result of the Department of Public Health's (DPH) Logan Airport Health Study, Massport has provided funding for the East Boston Neighborhood Health Center to enhance services and educational resources for children and adults in East Boston and Winthrop who are managing asthma and/or Chronic Obstructive Pulmonary Disease (COPD). Massport should continue to fund this program and should consult with the Health Center to evaluate opportunities to expand current services, outreach, and prevention materials. The expanded program should include collaboration with East Boston and Winthrop public school nurse coordinators to identify additional high risk individuals in schools and ways to expand outreach efforts. I also recommend that Massport work with the Health Center to provide appropriate HEPA room air purifier filters to high risk individuals identified through this program. I encourage Massport to work with community-based organizations to collaboratively determine how to further mitigate air quality impacts. The 2018/2019 EDR should describe how Massport will reengage with the Health Center and include an evaluation of how the services A-31

provided directly to and through Health Center (which are funded by Massport) can be expanded. A-31

Water Quality/Environmental Compliance

The 2017 ESPR describes Massport's ongoing environmental management activities including National Pollutant Discharge Elimination System (NPDES) compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan (MCP), and tank management. Massport's primary water quality goal is to prevent or minimize pollutant discharges, thus limiting adverse water quality impacts of airport activities. Massport employs several programs to promote awareness of activities that may impact surface and groundwater quality. Programs include implementing best management practices (BMPs) for pollution prevention by Massport, its tenants, and its construction contractors; training of staff and tenants; and a comprehensive stormwater pollution prevention plan.

The 2018/2019 EDR should identify any planned stormwater management improvements and report on the status of:

- NPDES Permit and monitoring results for Logan outfalls and the Fire Training Facility;
- Jet fuel usage and spills; A-32
- MCP activities;
- Tank management;
- Update on the environmental management plan; and
- Fuel spill prevention.

Conclusion

Massport may prepare a 2018/2019 EDR for submission consistent with the Scope included in this Certificate. I encourage Massport to target mid 2020 for filing of the 2018/2019 EDR. As noted above, should actual growth in passenger and/or aircraft operations outpace the forecasts, I expect that additional information will be provided in future EDRs to demonstrate that additional mitigation and policies and strategies will be implemented to address the proportional growth in impacts.

K. Theoharides

November 25, 2019
Date

Kathleen A. Theoharides

Comments received:

9/9/2019 Maryann Aberg
9/30/2019 Noel Scott

10/04/2019	Michael Adamian
10/09/2019	Vanessa Fazio
10/09/2019	Danielle Emond
10/09/2019	Karla Torres-Welch
10/09/2019	Lindsay Falewicz
10/10/2019	Kannan Thiruvengadam
10/10/2019	Fabricio Paes
10/10/2019	Phoebe Chadwick-Rivinus
10/10/2019	Mary Palermo
10/10/2019	Gaby Perry
10/10/2019	Nat Taylor
10/10/2019	Gillian Anderson
11/08/2019	Aileen Healy
11/13/2019	Meredith Shannon
11/13/2019	Kathleen Rourke
11/13/2019	Teresa Doyle
11/13/2019	Rosalind Mott
11/13/2019	Wendy Corkhum
11/18/2019	Town of Milton
11/18/2019	Town of Winthrop
11/20/2019	Anastacia Marx de Salcedo
11/20/2019	Richard Madden
11/20/2019	Carla Ceruzzi
11/20/2019	Cindy Christiansen
11/20/2019	Mary Tittmann
11/20/2019	Nancy Timmerman
11/20/2019	Department of Energy Resources
11/20/2019	Dorothy Ahle
11/20/2019	Frank Ciano
11/20/2019	Ursula Kullmann
11/20/2019	Romero Kuhn
11/20/2019	Matthew A Romero Massport CAC
11/20/2019	Lydia Edwards, Boston City Councilor
11/20/2019	Conservation Law Foundation
11/20/2019	Myron Kassaraba
11/20/2019	Carol Goss
11/20/2019	Alan Wright
11/20/2019	Meredith Shannon
11/20/2019	Darcey Deveny
11/20/2019	Thomas Phipps
11/20/2019	Edward Beuchert
11/20/2019	Claire Silvers
11/20/2019	Sheila Mooney
11/20/2019	Lisa Avery
11/20/2019	Danielle Simbajon
11/20/2019	Kathleen Rourke
11/20/2019	David Matheu
11/20/2019	Kathleen Higgins
11/20/2019	Gary Gryan
11/20/2019	Anita Gryan
11/20/2019	DeeNee Skipper
11/20/2019	Barbara Franklin
11/20/2019	Bill Trabilicy
11/20/2019	Martha Karchere
11/20/2019	Julia Burrell
11/20/2019	Peter Houk
11/20/2019	JP Petriello
11/20/2019	Andrea van Wien
11/20/2019	Andrea van Wien, 2nd Comment
11/20/2019	Ryan Miller
11/20/2019	Representative Roselee Vincent
11/21/2019	Representative Adrian Madara
11/21/2019	Airport Impact Relief, Inc.
11/22/2019	City of Malden
11/22/2019	Catherine McNeil
11/22/2019	Senator Walter Timilty
11/22/2019	Maureen Wing
11/22/2019	Airlines for America

Form Letters sent via email subject line: "Opposition to ESPR 2017"

10/ 12/2019	Audrina Warren
10/ 12/2019	Sara Goldsmith
10/ 17/2019	Jim Linthwaite
10/17/2019	Susan M. Horn
10/ 17/2019	Jodi Remington
10/ 17/2019	Monique Labbe
10/17/2019	Paul K. Ciampa
10/ 17/2019	Colleen Murphy
10/ 17/2019	Nancy Hurley-Claflin
10/ 17/2019	Tom Claflin
10/ 17/2019	fwb823@yahoo.com
10/ 17/2019	Robin Maguire
10/ 17/2019	Steven Tamasy
10/ 17/2019	Rebecca Lynds
10/17/2019	John Casamassima
10/17/2019	Kathryn Skogstrom
10/17/2019	Lisa DeAngelico
10/17/2019	Rebecca Gorlin
10/17/2019	Julie Rizzo
10/17 2019	Andrew Desantis
10/17/2019	Nikolas Navakos
10/17/2019	Ida Migliore
10/17/2019	Christopher Tkach
10/17/2019	Lucas Rossier
10/17/2019	Jane Paronich
10/17/2019	Charles Cambria
10/17/2019	Ali Reed
10/17/2019	Nick Camacho
10/17/2019	Jenn Cunio
10/17/2019	Michelle Mccann
10/17/2019	Angela Cilibrasi
10/17/2019	Christy Tatarian
10/17/2019	Anthony Leonardi
10/17/2019	Damien Margardo

10/17/2019	Mary Ryan	10/20/2019	Nicole Bishop
10/17/2019	Gail Miller	10/21/2019	Mariellen Dalton
10/17/2019	Kristen D'Avolio	10/21/2019	Josephine Fatta
10/18/2019	Suzanne & Scott	10/21/2019	Josephine Matthews
10/18/2019	Bobbie Ross	10/21/2019	Julia Collins
10/18/2019	Mikki De Sisto Falcone	10/21/2019	Cheryl Granara
10/18/2019	Jim Linthwaite	10/21/2019	Ariana Lehrer
10/18/2019	Rick Sherva	10/21/2019	Josephine Fatta
10/18/2019	Michael Mullen	10/21/2019	Jake Bernier
10/18/2019	Kelly O'Keefe	10/21/2019	Carole Brown
10/18/2019	Mary Oconnor	10/22/2019	Aleksandra Kuzina
10/18/2019	Kevin Donahue	10/22/2019	Roberta W Benton
10/18/2019	Karen Gaeta	10/22/2019	Dominique Bonafoux
10/18/2019	Sheryl Fleitman	10/22/2019	Robert Fiore
10/18/2019	Kathleen Toland	10/22/2019	Marie Piacenza
10/18/2019	Lynn Donovan	10/22/2019	Dawn Sullivan
10/18/2019	Kathleen Toland	10/22/2019	Frederico Leal
10/18/2019	Cathy Huban	10/22/2019	Joan Dimarzo
10/18/2019	Leydon, Susan	10/22/2019	Vincent Crossman
10/18/2019	Chris Millerick	10/22/2019	Wendy Corkhum
10/18/2019	Brian Vogel	10/22/2019	Tracey Honan
10/18/2019	Angela Auda	10/22/2019	Lisa Foley
10/18/2019	Deanna Castano	10/22/2019	johnbegood73@outlook.com
10/18/2019	Rebecca Gorlin	10/22/2019	Teresa Carroll
10/18/2019	Angelique Pirozzi	10/22/2019	Cindy L. Christiansen
10/18/2019	Gezim Mucelli	10/22/2019	Elizabeth Tanefis
10/18/2019	Catherine Sullivan	10/22/2019	Danielle Meeker
10/18/2019	Colleen Murphy	10/22/2019	Carol Leary
10/18/2019	Gina Cassetta	10/22/2019	Nick Loconte
10/18/2019	Dominic Rizzott o	10/22/2019	Deborah Lalone
10/18/2019	Kim Brazier	10/22/2019	Elaine Sullivan
10/18/2019	Sara Swart	10/22/2019	James Roberts
10/18/2019	Anne Griepenburg	10/22/2019	Albee Schimanski
10/18/2019	Barbara Franklin	10/22/2019	Bill Curtis
10/19/2019	Jeanne Stewart	10/22/2019	Isabella Tocci
10/19/2019	Maura Garrity	10/22/2019	James Roberts
10/19/2019	Luz-Dary Barlow	10/22/2019	William Tanner
10/19/2019	Shannon Viera	10/22/2019	Lisa Jacobson
10/19/2019	Roberta W Benton	10/22/2019	Magdalena Ayed
10/19/2019	Mary Gail Murphy	10/22/2019	Jenn Goonan
10/19/2019	Kevin Slattery	10/22/2019	Patricia Dunn
10/19/2019	Brian Ferrari	10/23/2019	Judith Gundersen
10/19/2019	Ian Chiang	10/23/2019	Donna Swanson
10/19/2019	Heather McKinnon Glennon	10/23/2019	Trudy Marsoloni
10/19/2019	Mary Palermo	10/23/2019	Liz ORourke
10/19/2019	Tracey Honan	10/23/2019	Linda Nelson
10/19/2019	Rebecca Connell	10/23/2019	Stacie and Brian Marley
10/19/2019	Eivin Hila	10/23/2019	Carole Brown
10/20/2019	Theodore Resnikoff	10/23/2019	Scott Gagnon
10/20/2019	Jaclyn Loson	10/24/2019	Hagar Shirman
10/20/2019	Jennifer Harris	10/25/2019	Christopher Pearl
10/20/2019	Kathy Masterson	10/25/2019	Wendy Corkhum
10/20/2019	Nancy Morelli	10/26/2019	Jane Moncreiff
10/20/2019	Bill Masterson	10/26/2019	Roberta W Benton
10/20/2019	Zachary Heath	10/26/2019	Kim Brazier
10/20/2019	Liddy Cole	10/26/2019	David Brazier

10/27/2019	Martin Shannon
10/27/2019	Zachary Speert
10/28/2019	Layne Petrie
10/28/2019	Suzanne Knight
10/29/2019	Maria Drewnowski
10/29/2019	Scott Oakley Hersey
10/30/2019	Paul Skogstrom
10/30/2019	Jonathan Hess
10/31/2019	Christopher Marchi
10/31/2019	Amy Tai
11/03/2019	Baljinder Nijjar
11/03/2019	Jonvante Nijjar
11/03/2019	Jasmine Nijjar
11/03/2019	Sandra Nijjar
11/03/2019	Magdalena Ayed
11/04/2019	arytych@voyager.net
11/05/2019	Julia Wallerce
11/05/2019	Alyssa Vangeli
11/16/2019	Gail Miller
11/16/2019	Sonja Tengblad
11/17/2019	Anne Riesenfeld
11/17/2019	Sarah Paysnick
11/17/2019	Meredith Krebs-Smith
11/17/2019	Charles Blandy
11/18/2019	Jonathan Hess
11/18/2019	Catherine McNeil, 1st Comment
11/18/2019	Catherine McNeil, 2nd Comment
11/18/2019	Catherine McNeil, 3rd Comment
11/18/2019	Beth Battson
11/18/2019	Charles Bartoloni
11/18/2019	Anita Albright
11/18/2019	Judith Gundersen
11/18/2019	Brian Crosse
11/18/2019	Amy King
11/18/2019	Suzanne Knight
11/18/2019	Peter Dunn
11/18/2019	Johanna Bronk
11/18/2019	Allison Donelan
11/18/2019	Andrea LeBlanc
11/19/2019	Daryl Warner
11/19/2019	Ellen Daly
11/25/2019	Kevin Donahue

KAT/ACC/acc

Comment #	Author	Topic	Comment	Response
A-1	Kathleen Theoharides, Secretary	Analysis Years	Massport has requested to combine the 2018 EDR and the 2019 EDR into one document referred to as the 2018/2019 EDR. I have considered and granted this request.	This combined *2018/2019 Environmental Data Report (EDR)* follows the requirements of the Secretary's Certificate on the *2017 Environmental Status and Planning Report (ESPR)*, dated November 25, 2019. The document reports on 2018 and 2019 conditions with a comparison to 2017 conditions.
A-2	Kathleen Theoharides, Secretary	Forecasts/ Growth	The 2017 ESPR acknowledges that passenger activity has continued to grow faster than forecasts provided in the 2016 EDR and the 2011 ESPR. The majority of comment letters note that actual passenger growth has outpaced previous projections and identify concerns that measures to mitigate resulting noise, air quality, and transportation impacts have not been provided commensurate with the increased growth. Comments also identify concerns that the projected passenger growth rate underrepresents future conditions and associated impacts.	This *2018/2019 EDR* analyzes the continued growth in airport activity through 2019 and describes the community and environmental impacts of that activity. This EDR also provides initial consideration of the dramatic decline in Airport activity following the outbreak of COVID-19 in March 2020. Beginning in March 2020, flights in and out of Logan Airport were dramatically reduced and passenger levels dropped by over 90 percent at the peak of the pandemic in the spring and summer of 2020. At the time of this filing, Logan Airport was operating at levels not seen since the 1970s. As a result, there are far fewer aircraft operations and passengers and a dramatic drop in overall Logan Airport activity. While activity levels began a slow rebound in mid-summer 2020, national and international aviation activity forecasts suggest a several year recovery to regain pre-COVID-19 conditions. The *2020 EDR* will present the best information available at that time. The dramatic reduction in Logan Airport activity has also translated to a substantial reduction in community impacts. These initial impacts will be analyzed in the *2020 EDR*. As Massport begins to better understand future passenger activity and aircraft operations trends, forthcoming EDRs will outline the continuing and evolving strategies to minimize operational and environmental impacts of Logan Airport operations.
A-3	Kathleen Theoharides, Secretary	Public Health Research Findings	Comments also request that Massport present more direct information about the major research findings around health and airport impacts, including likely pollution and noise health impacts, and commitments from Massport for the reduction of and mitigation of these impacts.	Massport continues to present information on research findings on public health, including noise and air emissions. Refer to the summaries of ongoing noise studies in Chapters 6, *Noise Abatement* and study findings on impacts of aviation emissions on air quality and public health in Chapter 7, *Air Quality/Emissions Reduction*. Massport will continue to advance strategies for reducing overall Logan Airport-related impacts.
A-4	Kathleen Theoharides, Secretary	Content/ Scope	The 2018/2019 EDR should report on the progress and other refinements for tracking noise, traffic, and air emissions and abatement efforts, as further described in the Scope below.	This combined *2018/2019 EDR* follows the requirements of the Secretary's Certificate on the *2017 ESPR*, dated November 25, 2019. Each of these topics are addressed in separate sections, and describes findings from 2018 and 2019, with comparisons to 2017 conditions.
A-5	Kathleen Theoharides, Secretary	Forecasts/ Growth	Should actual growth in passenger and/or aircraft operations outpace the forecasts, I expect that additional information will be provided in future EDRs. Specifically, the EDR(s) should explain the circumstances that caused the growth, describe how this may affect the impact forecasts, and identify mitigation and policy strategies that will be implemented to address the proportional growth in impacts. Furthermore, I reserve the right to require that future ESPRs evaluate the impacts of a range of activity forecasts, based on the results of the interim reporting provided in the EDRs.	While passenger levels reached a new milestone in 2019, in March 2020, flights in and out of Logan Airport were dramatically reduced and passenger levels dropped by over 90 percent at the peak of the pandemic in the spring and summer of 2020. While recovery is expected, the timeline for a return to recent levels is not yet known. The *2020 EDR* will provide the best available information. As always, the EDRs and ESPRs will provide regular updates on operational and environmental impacts and Massport's strategies to minimize those community impacts.

Comment #	Author	Topic	Comment	Response
A-6	Kathleen Theoharides, Secretary	Scope	The 2018/2019 EDR must include information on the environmental policies and planning that form the context of environmental reporting, technical studies, and environmental mitigation initiatives against which projects at Logan Airport can be evaluated. This should include identification of the cumulative effects of Logan Airport operations and activities. The results of the Logan Airport Air Passenger Ground Access Survey and the Long-term Parking Management Plan should inform transportation planning and strategies to achieve the high occupancy vehicle (HOV) mode share goal.	Chapter 5, *Ground Access to and from Logan Airport*, Chapter 6, *Noise Abatement*, Chapter 7, *Air Quality/Emissions Reduction*, and Chapter 8, *Environmental Compliance and Management/Water Quality* include the regulatory framework that guide the technical studies. Each project that is subject to the Massachusetts Environmental Policy Act (MEPA) follows this framework in the impact assessments and development of mitigation strategies, if needed. The status of mitigation measures associated with projects' Section 61 Findings are documented in Chapter 9, *Environmentally Beneficial Measures and Project Mitigation Tracking*. The EDRs and ESPRs describe the cumulative impacts associated with overall Logan Airport operations, and compares them year-over-year to previous and anticipated conditions. These documents inform the projects that are subject to MEPA (and the National Environmental Policy Act [NEPA]) and serve as baseline condition against which to assess project-specific impacts. The results of the Logan Air Passenger Ground Access Survey informed the HOV and ground access strategy as described in Chapter 5, *Ground Access to and from Logan Airport*. This strategy is being evaluated on an ongoing basis to adapt to the changes associated with the pandemic and the resultant passenger demands for airport access.
A-7	Kathleen Theoharides, Secretary	Responses to Comments	The 2018/2019 EDR must include copies of all ESPR and EDR Certificates and a distribution list (indicating those receiving documents, CDs, or Notices of Availability). Supporting technical appendices should be provided as necessary.	Appendices A and B include copies of the Secretary's Certificate on the *2017 ESPR* and all the comment letters received on the document. Responses to comments for the Certificate and comment letters are provided in this document. Supporting appendices are provided for each technical chapter with appropriate references in each chapter. Appendix D, *Distribution* provides a distribution list of all individuals who received copies of this *2018/2019 EDR* through an Notice of Availability and online link or hard copy.
A-8	Kathleen Theoharides, Secretary	Responses to Comments	The Response to Comments section should address all of the substantive comments on the 2017 ESPR, and other Certificates for Logan Airport that reference EDR/ESPR documentation (e.g. Logan Airport Parking Project, Terminal E). To ensure that the issues raised by commenters are addressed, the 2018/2019 EDR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended to, and shall not be construed to, enlarge the scope of the EDR beyond what has been expressly identified in this Certificate. The Responses to Comments should not reference a section of the EDR unless they are directly responsive to the comment. Common themes that should be addressed throughout the EDR and in the Responses to Comments include noise (modeling of noise contours and noise abatement) and emissions reduction issues.	Appendices A and B include copies of the Secretary's Certificate on the *2017 ESPR* and all the comment letters received on the document. The Certificate and each comment letter have individual comments delineated and numbered for review. Each comment is addressed and where appropriate, specific sections in the chapters are referenced. A number of form letters were received on the *2017 ESPR*. The comments in the form letters were delineated and also responded to, with references as needed. Common themes, including noise contours modeling and noise abatement and air emissions strategies, are addressed.

Comment #	Author	Topic	Comment	Response
A-9	Kathleen Theoharides, Secretary	Forecasts/ Growth	Many comments identify concerns that Massport may reach 50 million annual passengers much sooner than the projected 10 to 15 year timeframe. I expect that additional information will be provided in future EDRs if actual growth in passenger and/or aircraft operations outpace the forecasts, including a discussion of passenger and activity levels and planning/mitigation to address impacts of the growth. I reserve the right to require that future ESPRs evaluate a range of activity forecasts based on the results of this interim report. I also expect that air and noise emissions related to passenger and activity levels and planning/mitigation will be a significant emphasis of the 2018/2019 EDR.	As is discussed in this EDR, the impacts of the worldwide COVID-19 pandemic have been severe on Logan Airport. At the peak of the pandemic, aircraft operations fell by 60 percent and passenger levels dropped as much as 90 percent below 2019 levels. The *2017 ESPR* included a forecast of up to 50 million annual passengers. At the time of this EDR filing, it appears that 2020 passenger levels will reach between 8 and 10 million annual passengers, a level not seen since the mid-1970s. The *2020 EDR* will provide the best available information on the recovery of passenger and operational levels, and the next ESPR will provide an updated forecast based on industry trends in the next few years and the state of the international economy and travel trends.
A-10	Kathleen Theoharides, Secretary	TNC/RideApp	The 2018/2019 EDR should report on the effectiveness of the TNC management plan and provide an update on planned and executed measures to relieve on-Airport roadway congestion.	In 2018, Massport relocated the RideApp pool from the Red Lot to the taxi pool location on Porter Street and moved the taxi pool to the Blue Lot (next to the Logan Office Center). In 2019, Massport relocated the gas station from Terminal E to the Red Lot, making it closer to the Rental Car Center (i.e., rental car returns) and the limousine, taxi, and RideApp pools. Each of these relocations generally improved on-Airport routing by shortening the distances between key, active nodes. Details of the 2018 and 2019 vehicle miles traveled (VMT) modeling results are presented in Appendix G, *Ground Access to and from Logan Airport*.
A-11	Kathleen Theoharides, Secretary	Sustainability	The 2018/2019 EDR should provide updates to airport wide sustainability goals.	Chapter 1, *Introduction/Executive Summary* provides updates to Massport's sustainability and resiliency program. In addition, Massport reports on progress towards resiliency goals in its *Annual Sustainability & Resiliency Reports*. Additional information about Massport's resiliency initiatives is available at: http://www.massport.com/massport/business/capital-improvements/sustainability/climate-change-adaptation-and-resiliency/.
A-12	Kathleen Theoharides, Secretary	Air Quality/ GHG Emissions	The 2018/2019 EDR should incorporate GHG emissions reporting consistent with that provided in the 2017 ESPR which was normalized to support effective review and analysis. In addition, Massport should ensure that only conditioned (heated and cooled, enclosed buildings) building areas are included in energy use and emission intensity calculations, report input energy components (oil, gas, electricity) and central plant data, and clarify how renewables are accounted in the analysis. I encourage Massport to consider the recommendations identified in comments from the Department of Energy Resources (DOER) which recommend electrification of space and water heating as well as evaluation of opportunities for distributed renewable energy generation. Massport should consult with the MEPA Office and the DOER regarding presentation of GHG data in the 2018/2019 EDR.	The 2018 and 2019 greenhouse gas (GHG) emission analyses in this EDR follow EEA guidelines and use widely-accepted emission factors that are considered appropriate for airports, including Intergovernmental Panel on Climate Change (IPCC) and U.S. Environmental Protection Agency (EPA), as well as being consistent with Airport Cooperative Research Program (ACRP) guidance. For consistency and comparative purposes, the 2018 and 2019 GHG emissions are segregated by ownership and control into categories. These categories are further characterized by the degree of control that Massport has over the GHG emission sources including: Category 1: Massport Owned, Category 2: Tenant Owned, and Category 3: Public/Private Owned. Starting with the *2016 EDR*, Massport has augmented its GHG reporting to include the following metrics: -GHG emissions (Scopes 1 and 2) per passenger (pounds [lbs.] of CO_2 per passenger); -Building energy use intensity (thousand British thermal units [kBTU] per square foot); and -Building GHG emissions per square foot (lbs. CO_2e per square foot). Refer to Chapter 7, *Air Quality/Emissions Reduction* for this information. Massport continues to review its heating and cooling options to find the most energy and cost effective approaches, using existing infrastructure, heating sources, and airport operations.

Comment #	Author	Topic	Comment	Response
A-13	Kathleen Theoharides, Secretary	GHG Emissions	GHG emissions should continue to be quantified for aircraft, GSE, motor vehicles, and stationary sources using emission factors and methodologies outlined in the Greenhouse Gas Emissions Policy and Protocol issued by EEA and the Transportation Research Board's Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories as developed for the 2017 ESPR. The results of the 2018/2019 GHG emissions inventory should be compared to the 2017 results.	Chapter 7, *Air Quality/Emissions Reduction* presents the GHG methodology and inputs and compares results from 2018 and 2019 to 2017 findings. The 2018 and 2019 GHG emission analyses follow EEA guidelines and use widely-accepted emission factors that are considered appropriate for airports, including IPCC and EPA, as well as being consistent with ACRP guidance. Although the *2018/2019 EDR* is not subject to the MEPA GHG policy (because it does not propose any discrete projects), since the *2007 EDR*, Massport has continued to voluntarily prepare an inventory of GHG emissions both directly and indirectly associated with the Airport. The emission source categories in the *2018/2019 EDR* satisfy MEPA's requirement to analyze the environmental impacts of direct and indirect mobile and stationary source emissions.
A-14	Kathleen Theoharides, Secretary	Resiliency	The 2018/2019 EDR should continue to identify which recommendations will be implemented by Massport to improve resiliency.	Massport's continuing resiliency strategies and measures are presented in Chapter 1, *Introduction/Executive Summary*. Massport has completed an Authority-wide risk assessment, as part of its strategic planning initiative; issued a *Floodproofing Design Guide*; and developed a resilience framework to provide consistent metrics for short- and long-term planning and protection of its critical facilities and infrastructure. Beyond infrastructure resiliency, Massport is also focused on incorporating social and economic resilience into its long-term operational and capital planning. Massport's *Floodproofing Design Guide* was published in November 2014 and updated in November 2018. Massport reports on progress towards resiliency goals in its *Annual Sustainability & Resiliency Reports*. Additional information about Massport's resiliency initiatives is available at: http://www.massport.com/massport/business/capital-improvements/sustainability/climate-change-adaptation-and-resiliency/.
A-15	Kathleen Theoharides, Secretary	Air Quality/ Public Health	The 2018/2019 EDR should report on findings around health and airport impacts in relation to emissions, as well as measures to reduce these impacts.	Chapter 7, *Air Quality/Emissions Reduction* provides updated information regarding recent and ongoing scientific studies associated with airport emissions including the *Logan Airport Health Study* by Massachusetts Department of Health (2014), *Impacts of Aviation Emissions on Near-Airport Residential Air Quality* by Tufts University (2020), and similar airport-related health studies by the University of Southern California and University of Washington. The findings show key differences exist in the particle size distribution and the black carbon concentration for roadway and aircraft features.
A-16	Kathleen Theoharides, Secretary	Mitigation/ Sec. 61 Findings	The 2018/2019 EDR should continue to report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review. It should update the status of Massport's mitigation commitments and also identify projects for which mitigation is complete.	Chapter 9, *Environmentally Beneficial Measures and Project Mitigation Tracking* provides updated information regarding the status of Massport and tenant Section 61 Findings and associated mitigation commitments. As has been the convention in previous *EDRs/ESPRs*, the annual filings focus on commitments that are pending, underway (generally for active construction), or continuing. Once a specific mitigation measure or group of measures is complete, their status is no longer reported.
A-17	Kathleen Theoharides, Secretary	Airport Planning	The 2018/2019 EDR should continue to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner	Chapter 3, *Airport Planning* provides updated information regarding ongoing and potential future projects aimed at improving Logan Airport's operations and services. As has been noted throughout this *2018/2019 EDR*, as a result of the COVID-19 pandemic, many Massport projects have been reduced in scale or deferred. The projects' status as of October 2020 is reported in this *2018/2019 EDR*.

Comment #	Author	Topic	Comment	Response
A-18	Kathleen Theoharides, Secretary	Airport Planning, Ground Access	The 2018/2019 EDR should also indicate the status of long-range planning activities, including the status of public works projects implemented by other agencies within the boundaries of Logan Airport. The 2018/2019 EDR should identify the status and assess the effectiveness of ground access changes, including roadway and parking projects, that consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on streets in adjacent neighborhoods.	This *2018/2019 EDR* provides updates on Massport and other pertinent planning projects though October 2020. Due to the COVID-19 pandemic and associated passenger, operations and revenue reductions, Massport continues to adjust the timing and schedules for current and previously planned projects as well as ground access programs. The *2020 EDR* will provide updates, as available. We will continue to look at opportunities to shift drop-off/pick-up activity to HOV modes and acknowledge the local and regional benefits of doing so.
A-19	Kathleen Theoharides, Secretary	Regional Transportation	The 2018/2019 EDR should report on Regional Airports and Regional Transportation System.	Logan Airport is the centerpiece of the three airports owned and operated by Massport. It is the primary international and domestic airport operating within the network of New England regional airports. Massport also owns and operates Worcester Regional Airport and Hanscom Field; both of which play important roles in the New England regional transportation system. Chapter 4, *Regional Transportation* presents information on the New England regional airports and regional aircraft operations and air passenger activity level trends, and updates on local and regional long-ranges transportation planning.
A-20	Kathleen Theoharides, Secretary	Ground Access	The 2018/2019 EDR should provide an expanded mitigation package to address the transportation impacts associated with increased passenger activity should actual passenger growth outpace the forecasts.	As a direct impact of the COVID-19 pandemic, 2020 passenger levels are projected to be at or below levels experienced in the mid-1970s when Logan Airport handled around 9 million annual passengers. Massport expects to be able to provide an update on projected future levels as part of the *2020 EDR* . Flights in and out of Logan Airport are dramatically reduced and passenger levels dropped over 90 percent during spring 2020. As a result, while passenger numbers are beginning a slow recovery, there are far fewer passengers and employees traveling to and from Logan Airport and there is far less roadway congestion both in Boston and the metropolitan area. In addition, the public's interest in using HOV transportation services like buses, rapid transit, and commuter rail, has also been significantly affected by concerns about COVID-19. Within that context, Massport continues to evaluate and plan for the recovery of air passenger activity and remains committed to implementing the broad range of ground access strategies that are outlined in Chapter 5, *Ground Access to and from Logan Airport* .

Comment #	Author	Topic	Comment	Response
A-21	Kathleen Theoharides, Secretary	Ground Access	Report on 2018 and 2019 ground access conditions compare to 2017 for the following: • Compliance with Logan Airport Parking Freeze; • High-occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Water Transportation, and Logan Express); • Logan Airport Employee Transportation Management Association (Logan TMA) services; • Gateway volumes; • On-airport traffic volumes; • On-airport vehicle miles traveled (VMT); • Parking demand and management (including rates and duration statistics); • Status of long-range ground access management strategy planning and the connection to the MBTA Airport Station associated with the planned Terminal E Modernization; • Project, anticipated MBTA ridership, and possible changes in HOV mode share; and • Trends of transportation network companies (TNCs), such as Uber and Lyft, and their operations at Logan Airport	Chapter 5, *Ground Access to and from Logan Airport* presents this information, including 2020 updates, as available. Massport has a comprehensive, multi-pronged, trip reduction strategy to diversify and enhance ground transportation options for passengers and employees traveling to and from Logan Airport. The ground transportation strategy is designed to offer passengers traveling to and from Logan Airport with a choice of HOVs, transit, and shared-ride options that are convenient and reliable, and that reduce environmental and community impacts.
A-22	Kathleen Theoharides, Secretary	Ground Access	The 2018/2019 EDR should address the following topics: • Target HOV mode share and incentives; • Impact of TNCs on Logan Airport landside operations and effectiveness of the TNC management plan; • Update on parking conditions; • Non-Airport through-traffic; • Cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line, Silver Line, Water Transportation, and Logan Express; • Report on efforts to increase capacity and use of Logan Express; • Progress on enhancing water transportation to and from Logan Airport; • Results and recommendations of the ground access study Long-term Parking Management Plan required by the Parking Freeze amendments; and • Strategies for enhancing services and increasing employee membership in the Logan Airport TMA.	Chapter 5, *Ground Access to and from Logan Airport* presents this information, including 2020 updates, as available. Air traffic and passenger activity levels have been significantly affected by concerns about COVID-19. Within that context, Massport continues to evaluate and plan for the recovery of air passenger activity and remains committed to implementing the broad range of ground access strategies that are outlined throughout the chapter. The schedule for those improvements will be adjusted according to the current conditions.

Comment #	Author	Topic	Comment	Response
A-23	Kathleen Theoharides, Secretary	Noise	The 2018/2019 EDR must provide strategies to address noise impacts which are expressed in numerous comments received on the 2017 ESPR. Massport should continue to implement and develop additional noise abatement measures, such as runway use restrictions and reduced-engine taxiing. Massport should also coordinate with stakeholders through the Massport Community Advisory Committee to identify opportunities to reduce noise.	Massport strives to minimize the noise effects of Logan Airport operations on its neighbors through a variety of noise abatement programs, procedures, studies, and other tools. At Logan Airport, Massport implements one of the longest standing and most extensive noise abatement programs of any airport in the nation. Massport's comprehensive noise abatement program includes a dedicated Noise Abatement Office; an industry leading Noise and Operations Monitoring System (NOMS); extensive residential and school sound insulation programs; time of day and runway restrictions for noisier aircraft; ground run-up procedures; and flight tracks designed to optimize over water operations (especially during nighttime hours). Chapter 6, *Noise Abatement* provides information on noise abatement strategies, and documents its stakeholder involvement activities.
A-24	Kathleen Theoharides, Secretary	Noise	The 2018/2019 EDR should also provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. Report on 2018 and 2019 conditions and provide a comparison to 2017 for the following: • Fleet Mix, including Stage II, Recertified Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft; • Nighttime operations; • Runway utilization (aircraft and airline adherence with runway utilization goals); • Preferential runway advisory system (PRAS) tracking; and • Flight tracks.	Chapter 6, *Noise Abatement* describes the runway use, fleet mix, level of operations, noise levels, and modeled noise conditions at Logan Airport related to aircraft operations during 2018 and 2019 and compares the findings to those for 2017 and selected prior years.
A-25	Kathleen Theoharides, Secretary	Noise	The 2018/2019 EDR should report on the following: • Changes in annual noise contours and noise-impacted population; • Measured versus modeled noise values, including reasons for differences and any improvements attributable to the models deployed; • Cumulative Noise Index (CNI); • Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels; and • Flight track monitoring noise reports.	Chapter 6, *Noise Abatement* describes noise conditions for 2018 and 2019 which were assessed primarily through detailed computer modeling, supplemented by the analysis of measured noise levels from Logan Airport's noise monitoring system. This *2018/2019 EDR* provides information on noise conditions using the latest FAA noise modeling software, the Aviation Environmental Design Tool (AEDT). Noise analysis results include day-night average sound level (DNL) noise contours and estimates of the population residing within various increments of noise exposure for 2018 and 2019. This chapter also includes a comparison of the modeled results with measured levels for 2018 and 2019 from the noise monitoring system. Supplemental noise metrics include Logan Airport's Cumulative Noise Index (CNI), Time Above (TA) various threshold sound levels, and periods of dwell and persistence of noise levels to provide a better understanding of the noise environment. Massport also provides a progress report on ongoing noise abatement measures and any new noise abatement initiatives affecting Logan Airport.
A-26	Kathleen Theoharides, Secretary	Noise	The 2018/2019 EDR should report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide an update on the noise and operations monitoring system. Report on the status of Block 1 and 2 of the RNAV Pilot Project.	Chapter 6, *Noise Abatement* presents information on an Environmental Assessment (EA) developed by FAA to support a permanent RNAV (GPS) approach procedure for Runway 4L. This project will provide a de-conflicted stabilized approach procedure that includes vertical and lateral guidance for when weather or winds require an aircraft to land on Runway 4L. In coordination with Massport, FAA led this process in October 2019 and provided a status presentation to the Massport Community Advisory Committee (CAC) during its January 2020 meeting. The Draft EA was available for public review, and FAA held public workshops in October 2020.

Comment #	Author	Topic	Comment	Response
A-27	Kathleen Theoharides, Secretary	Air Quality	The 2018/2019 EDR should contain an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. Provide a discussion of progress on national and international levels to decrease air emissions.	Chapter 7, *Air Quality/Emissions Reduction* provides updated information regarding recent and ongoing scientific studies associated with airport emissions including the *Logan Airport Health Study* by Massachusetts Department of Health (2014), *Impacts of Aviation Emissions on Near-Airport Residential Air Quality* by Tufts University (2020), and similar airport-related health studies by the University of Southern California and University of Washington. This chapter also describes advancements on the national and international levels to decrease airport-related air emissions have continued to focus primarily on three initiatives: the advanced quantification of particulate matter (PM) and hazardous air pollutants (HAPs) emissions from aircraft engines; the continued phasing-in of alternative fuel vehicles (AFVs); and the implementation of GHG emissions reduction strategies.
A-28	Kathleen Theoharides, Secretary	Air Quality	The 2018/2019 EDR should provide enhanced mitigation related to air emissions to address the potential of 50 million air passengers and increased activity levels if this level of growth is attained prior to the Future Planning Horizon timeframe.	The *2017 ESPR* included a forecast of up to 50 million annual passengers. While 2019 ended with approximately 42.5 million annual passengers, due to the impacts of the COVID-19 pandemic, 2020 passenger levels have dropped to levels last experienced in the mid-1970s. A new timeframe for achieving a 50 million annual passengers forecast cannot be developed at this time. The *2020 EDR* will present updates, as available.
A-29	Kathleen Theoharides, Secretary	Air Quality	Report on Massport and tenant alternative fuel vehicle programs and the status of Logan Airport air quality studies undertaken by Massport or others, as available.	Chapter 7, *Air Quality/Emissions Reduction* describes Massport's AFV Program, which is designed to replace Massport's conventionally-fueled fleet with alternatively fueled or powered vehicles, when feasible, to help reduce emissions associated with Logan Airport operations. Massport now operates 103 vehicles powered by CNG, propane, E85 flex fuel, diesel/electric hybrid, gasoline/electric hybrid, and plug-in electric.
A-30	Kathleen Theoharides, Secretary	Air Quality/ Public Health	The 2018/2019 EDR should present more direct information about the major research findings around health and airport impacts in relation to emissions, including likely pollution and noise health impacts, and commitments from Massport for the reduction and mitigation of these impacts.	Massport continues to present information on research findings on public health, including noise and air emissions. Refer to Chapters 6, *Noise Abatement* and 7, *Air Quality/Emissions Reduction,* which present summaries and links to recent study findings related to airport noise and air quality impacts on public health. Massport will continue to advance strategies for reducing overall Logan Airport-related impacts.
A-31	Kathleen Theoharides, Secretary	Air Quality/ Public Health	I encourage Massport to work with community-based organizations to collaboratively determine how to further mitigate air quality impacts. The 2018/2019 EDR should describe how Massport will reengage with the Health Center and include an evaluation of how the services provided directly to and through Health Center (which are funded by Massport) can be expanded.	Massport is continuing to collaborate with the East Boston Health Center to work to find an acceptable solution.
A-32	Kathleen Theoharides, Secretary	Water Quality/ Environmental Compliance	The 2018/2019 EDR should identify any planned stormwater management improvements and report on the status of: • NPDES Permit and monitoring results for Logan outfalls and the Fire Training Facility; • Jet fuel usage and spills; • MCP activities; • Tank management; • Update on the environmental management plan; and • Fuel spill prevention.	Chapter 8, *Environmental Compliance and Management/Water Quality* reports on the required items as noted. The most recent update to the Stormwater Pollution Prevention Plan (SWPPP) which is part of the National Pollutant Discharge Elimination System (NPDES) permit was completed in October 2019 and distributed to Massport and its stormwater co permittees at its annual update meeting. The Logan Airport SWPPP addresses stormwater pollutants including deicing and anti-icing chemicals, bacteria, fuel and oil, and other sources of stormwater pollutants. Best management practices (BMPs) specific to aviation activities are included in the SWPPP. In accordance with the other requirements of the NPDES permit, Massport conducts training for personnel responsible for implementing activities identified in the SWPPP. The 2018 and 2019 Annual Certificates of Compliance were submitted jointly to the EPA and MassDEP in December 2018 and December 2019, respectively, by Massport and the co-permittees.

Secretary of the Executive Office of Energy and Environmental Affairs Certificate on the *Logan Airport 2016 EDR Notice of Project Change*

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March 9, 2018

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
NOTICE OF PROJECT CHANGE

PROJECT NAME	: 2016 Environmental Status and Planning Report (ESPR)/ Environmental Data Report (EDR)
PROJECT MUNICIPALITY	: Boston/Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: February 7, 2018

Pursuant to the Massachusetts Environmental Policy Act (MEPA; M.G.L. c. 30, ss. 61-62I) and Section 11.10 of the MEPA regulations (301 CMR 11.00), I have reviewed the Notice of Project Change (NPC) and **hereby determine** that a Supplemental Environmental Impact Report (EIR) is not required.

The NPC consists of a request by the Massachusetts Port Authority (Massport) to shift the timing and sequence of the 2016 Environmental Status and Planning Report (ESPR) and 2017 Environmental Data Report (EDR). Massport has proposed this change because it is concerned that 2016 is not an appropriate baseline year from which to forecast long-term operational and environmental conditions. The NPC indicates that the concern is based changes associated with: (1) rapidly growing domestic and international passenger demand; (2) the formal introduction to Logan Airport of transportation network companies (TNC), such as Uber and Lyft, in early 2017; and (3) use of the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT) for noise and air quality modeling for 2016 reporting.

I am granting this request based on the following:

NPC-1

- Massport will submit a 2016 EDR in lieu of the ESPR.
- The 2016 EDR will supplement typical EDR data reporting with discussion of future passenger and activity levels, planning to address growth and strategies to minimize environmental impacts.
- The 2016 EDR will include a draft Scope for the 2017 ESPR and identify when the ESPR will be filed.

Logan Airport Environmental Review and Planning

The environmental review process for Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The ESPR has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become, consistent with the objectives of the MEPA regulations, part of the long-range planning process for Massport. The ESPR provides a "big picture" analysis of the environmental impacts associated with current and projected activity levels, and presents a comprehensive strategy to minimize impacts.

The ESPR is generally updated on a five-year basis. EDRs (formerly referred to as Annual Updates) are filed annually in the years between ESPRs. EDRs consist of a status report and annual reporting on activity levels and associated environmental impacts at Logan Airport. ESPR's are also supplemented by (and ultimately incorporate) project-specific Environmental Impact Reports (EIR) that provide detailed analyses and mitigation commitments for proposed projects. The sequence and timing for submitting ESPRs and EDRs has been adjusted previously based on consultation between Massport and the Executive Office of Energy and Environmental Affairs (EEA). Most recently, with EEA approval, Massport deferred submittal of the 2011 ESPR by two years based on the regional and national economic downturn experienced in the mid- to late-2000s.

Through these reports, Logan Airport is subject to comprehensive and regular MEPA review, including opportunities for public comment on cumulative impacts. This regular updating and reporting on planning and cumulative impacts is unique among State Agencies. It reflects the challenge and complexity of managing and modernizing Logan Airport within a dense, urban area. It recognizes that the proximity of communities to the Airport warrants an enhanced level of public engagement and a concerted, long-term effort to minimize and mitigate impacts.

On February 17, 2017, I issued a Certificate on the 2015 EDR which contained a review of the 2015 EDR and Scope for the 2016 ESPR. This Certificate on the NPC is informed by and includes references to the 2015 EDR, data and conclusions. This Certificate supplements, but does not replace, the 2015 EDR Certificate. The Scope for the 2017 EDR will be revised based on the review of the 2016 EDR.

In 2015, Logan Airport served an all-time high of 33.4 million passengers, exceeding the 2014 historic peak. A significant portion of growth in passengers is driven by an increase in demand for international air service. Massport has responded to this demand by providing new service to international destinations and expanding service to existing destinations. As passenger levels have increased, aircraft operations remain significantly below the peak of 507,449 operations experienced in 1998 when Logan Airport served 26.5 million passengers. The reduction of over 130,000 annual flight operations combined with transition towards newer and larger aircraft with improved environmental performance and operational efficiencies, have supported passenger growth while limiting environmental impacts.

The long-term trend is towards more efficient operations and significant reductions in overall environmental impacts. Although environmental impacts are significantly lower compared to 1998 when operations were highest, comparison of activity level and environmental impact data to 2014 and more recent EDRs identifies increases in noise exposure, air emissions and traffic. These increases were not forecast in the 2011 ESPR. The increases are associated with passenger growth, changes in flight patterns and changes in modeling of noise and air quality.

The most significant change since 2011 is the introduction by the FAA of changes to area navigation (RNAV) procedures. The RNAV program has been implemented throughout the country and its primary purpose is to increase safety and operational efficiency. The implementation of several of these procedures has resulted in concentrations of flight patterns over certain communities and significant increases in noise exposure.

The impact of the RNAV program was reflected in the many comment letters received during review of specific projects, including the Terminal E Modernization Project (EEA# 15434). Massport and the FAA signed a Memorandum of Understanding (MOU) in 2017 to frame a new process for analyzing opportunities to incrementally reduce noise through changes or amendments to Performance Based Navigation, including RNAV procedures.

Another significant change identified in the 2015 EDR was the introduction of AEDT for emissions and noise modeling. Based on its evaluation of the model, Massport requested that FAA approve development of specific adjustments to the AEDT model consistent with those developed for the Integrated Noise Model (INM). Based on this consultation, Massport deferred use of the AEDT. Projections in the 2016 EDR will be based on AEDT and will provide an opportunity to review and comment on the model and results prior to its use in the 2017 ESPR.

In addition, Logan Airport passenger ground access is changing rapidly with the use of TNCs for departures and arrivals at the Airport. Massport has been collecting TNC data since February 2017 when TNCs began picking up, in addition to dropping off, at Logan. The 2017 ESPR will include limited data from 2016 and a year of data for 2017. NPC-2

The Scope for the 2016 EDR will include description and analysis of these changes which will influence results and projections and provide context for the 2017 ESPR. The deferment of the ESPR until 2019 will provide more meaningful data and will be employed to develop a more reliable baseline from which activity and impacts can be projected.

Scope for the 2016 EDR

General

The 2016 EDR should follow the general format of the 2015 EDR to provide an update on conditions at Logan Airport, including passenger and aircraft operation activity levels. It should include an Executive Summary and Introduction, similar to previous ESPRs and EDRs.

The 2016 EDR must include information on the environmental policies and planning that form the context of environmental reporting, technical studies, and environmental mitigation initiatives against which projects at Logan Airport can be evaluated. This should include identification of the cumulative effects of Logan Airport operations and activities, compared to previous years, as appropriate. It should report on status of Massport's proposed planning initiatives, projects, and mitigation measures. The results of the 2016 Logan Airport Air Passenger Ground Access Survey and the Long-term Parking Management Plan should be used in the 2016 EDR to inform transportation planning.

The technical studies should include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. The 2016 EDR must also respond to those issues explicitly noted in this Certificate and the comments received on the 2015 EDR and noted in the February 17, 2017 Certificate. NPC-3

A distribution list for the 2016 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates. Supporting technical appendices should be provided as necessary.

Response to Comments

The Response to Comments section should address all of the substantive comments on the 2015 EDR, and other Certificates for Logan Airport that reference EDR/ESPR documentation (e.g. Logan Airport Parking Project, Terminal E). NPC-4 To ensure that the issues raised by commenters are addressed, the 2016 EDR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended to, and shall not be construed to, enlarge the scope of the 2016 EDR beyond what has been expressly identified in this Certificate. I recommend that the Massport continue to use the format from the 2015 EDR. The Responses to Comments should not reference a section of the 2016 EDR unless they are directly responsive to the comment. Common themes that should be addressed throughout the EDR and in the Responses to Comments include noise (modeling of noise contours and noise abatement) and emissions reduction issues. The 2016 EDR should include sufficient information to address comments on traffic, air quality and public health which are common concerns of commenters. NPC-5

Activity Levels

Air traffic activity levels at Logan Airport are the basis for the evaluation of noise, air quality, and ground access conditions associated with the Airport. In this section, current activity levels at the Airport are compared to prior-year levels, and historical passenger and operations trends at Logan Airport dating back to 2000 which is the year Massport approved an Environmental Management Policy. The total number of air passengers increased by 5.7 percent to 33.4 million in 2015, compared to 31.6 million in 2014. As noted previously, the 2015 passenger level represents a record high for Logan Airport.

Passenger aircraft operations accounted for 91 percent of total aircraft operations in 2015. The total number of aircraft operations increased from 363,797 in 2014 to 372,930 in 2015, a 2.5-percent increase. This was preceded by a 0.7 percent increase from 2013 to 2014. Although operations are increasing compared to previous years, aircraft operations at Logan Airport remained well below the 487,996 operations in 2000 and the historical peak of 507,449 achieved in 1998. In 1998, Logan Airport served 26.5 million air passengers, compared to 33.4 million in 2015, which saw 134,519 fewer operations.

Air carrier efficiency continued to improve in 2015 as the average number of passengers per aircraft operation at Logan Airport grew from 87.0 in 2014 to 89.7 in 2015. This positive trend is indicative of the industry-wide shift toward higher aircraft load factors and an increase in the number of domestic and international destinations. Annual domestic passengers' activity levels increased from 26.5 million in 2014 to 27.8 million in 2015, a 4.8-percent increase. While the numbers of both domestic and international passengers have increased, international passenger demand continues to increase at a faster rate than domestic passenger demand. Total international passengers at Logan Airport increased from 5.0 million in 2014 to 5.5 million in 2015, a 10.9-percent increase. International passengers made up approximately 16.1 percent of total Airport passengers in 2015, and this is projected to increase steadily to nearly 20 percent of the total by 2030 or sooner. The 2015 EDR indicates that strong international passenger growth was driven by the economic attractiveness of the metropolitan Boston region and the strength of Boston as an origin and destination market. New international destinations from Logan Airport in 2015 included Mexico City, Hong Kong, Tel Aviv, and Shanghai.

The NPC indicates that passenger activity has continued to grow faster than forecasts provided in the 2015 EDR and that it is outpacing growth in aircraft operations. The 2016 EDR should describe how this trend will support Massport's long-standing goals to reduce overall operating and environmental impacts at the airport. 2016 The EDR should include more discussion of future passenger and activity levels and planning/mitigation to address impacts of growth than that which is typically provided in an EDR. NPC-6

The 2016 EDR should report on airport activity levels and aircraft operations, including:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
- Domestic and international passenger activity levels;
- Cargo and mail volumes;
- Compare 2016 aircraft operations, cargo/mail operations, and passenger activity levels to 2015 activity levels; and
- National aviation trends compared to Logan Airport trends.

Sustainability at Logan Airport

The 2015 EDR described Massport's airport wide sustainability goals as identified in its Environmental Management Policy (EMP) and 2015 Sustainability Management Report (SMR). The SMR identifies efforts to promote, coordinate and integrate sustainability Airport-wide. Progress towards achieving these goals was addressed in the 2015 EDR. Massport revised its Sustainable Design Standards and Guidelines (SDSG) in March 2011 which provide a framework for sustainable design and construction for both new construction and rehabilitation projects. Since 2000 Massport has been striving to achieve certification by the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) for new and substantial rehabilitation of building projects over 20,000 square feet (sf).

The 2016 EDR should report on progress on achieving EMP goals.

Climate Change

Massport assets and Logan Airport, in particular, are critical infrastructure and play an important role in the economy. As recognized in Governor Baker's recent Executive Order 569 "Establishing an Integrated Climate Change Strategy for the Commonwealth" and a suite of other state and municipal initiatives, the impacts of climate change must be an important consideration for development across the state. Climate change presents a serious threat to the environment and the Commonwealth's residents, communities and economy. The EO indicates that extreme weather events associated with climate change present a serious threat to public safety and the lives and property of our residences. The recent flooding and storm damage caused by two storms in early March underscore these risks and the importance of adaptation and resiliency planning.

The EO also identifies the transportation sector as a significant contributor to GHG emissions in the Commonwealth and the only sector in which GHG emissions are increasing. In 2017, EEA and the Massachusetts Department of Transportation (MassDOT) conducted a number of transportation listening sessions throughout the Commonwealth to inform development of strategies and programs to reverse the growth in this sector.

Massport has begun reporting on GHG emissions and, in recognition of the potential effects of climate change on Massport infrastructure and operations, Massport initiated a Disaster and Infrastructure Resiliency Planning (DIRP) Study. A particular concern for Massport is the effect of sea level rise and projected increases in the severity and frequency of storms. The Study includes Logan Airport, the Port of Boston, and Massport's waterfront assets in South and East Boston. The DIRP Study includes a hazard analysis; modeling of projected sea-level rise and storm surge; temperature and precipitation projections; and anticipated increases in extreme weather events.

The 2016 EDR should provide a summary of the DIRP Study and identify which recommendations Massport will implement in the short term to increase the resiliency of its facilities to the potential effects of climate change.

Mitigation

The 2015 EDR identifies the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review. The 2016 EDR will continue to be the forum to address cumulative, Airport-wide impacts. The 2016 EDR should update the status of mitigation commitments for recent projects such as the Terminal E Modernization Project and the Logan Airport Parking Project as well as projects previously included in the 2015 EDR.

Planning

The Airport Planning section of the 2016 EDR should describe the status of projects underway or completed at Logan Airport by the end of 2016 and provide updates for projects in progress. It should address planning, construction, and permitting activities. Specific topics include terminal area projects, service area projects, buffer/open space projects, Airport parking projects, airside area projects, high occupancy vehicle (HOV) improvements, and Airport-wide projects. Project updates include:

- *Terminal E Renovation and Enhancements Project*: This project includes interior and exterior improvements at Terminal E to accommodate regular service by wider and longer Group VI aircraft. The project will reconfigure three gates to accommodate Group VI aircraft (including the Airbus A380 and Boeing 747-8 primarily used by international air carriers) and will reconfigure passenger holdrooms to accommodate larger passenger loads associated with these aircraft. Construction commenced in 2015.

- *Terminal E Modernization Project*: This project will accommodate existing and long range forecasted demand for international service. The expansion will add the three gates approved in 1996 (International Gateway West Concourse project, EEA #9791), which were never constructed, and an additional two to four additional new gates in an extended concourse. A key feature of this project is the first direct pedestrian connection from the MBTA Blue Line Airport Station to the terminal complex at Logan Airport. It will also include improvements to Airport roadways to facilitate access. The project completed MEPA review in 2016. Phase 1 has been permitted and is in the final design stage.

- *Terminal C to E Connector:* This project provides a new post-security connection between Terminals C and E on the Departures Level and provides improved passenger circulation within the post-security concourses, additional holdroom space at Terminal E, reconfigured office space, concessions and concessions support, and a new consolidated location for escalators and stairs. The project was completed in May 2016.

- *Terminal B Airline Optimization Project:* Massport is upgrading its facilities on the Pier B side of Terminal B to meet airlines' needs (primarily reflecting the merger of American Airlines and US Airways) and to provide facilities that improve the passenger traveling experience. Similar improvements have been implemented with the recent renovations and improvements at Terminal B, Pier A. Planned improvements include an enlarged ticketing hall, improved outbound bag area, expanded bag claim hall, expanded concession areas, and expanded holdroom capacity at the gate.

  Logan Airport Parking Project: This project includes the construction of up to 5,000 new commercial parking spaces to reduce trip generation associated with increases in passenger drop-off and pick-up at the airport. The Certificate on the ENF was issued on May 5, 2017 and included a Scope for the Draft Environmental Impact Report (DEIR). This project required an amendment to the Logan Airport Parking Freeze Regulations (310 CMR 7.30). MassDEP proposed amendments to the regulations on March 24, 2017 and amendments were promulgated last year.

In the absence of a 2016 ESPR and the significant public interest in passenger growth, ground access, noise and air quality, the 2016 EDR should provide a broader context for long range planning than would normally be included in an EDR. It should address planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. The 2016 EDR should describe the status of planning initiatives for the following areas: NPC-7

- Roadways and Airport Parking;
- Terminal Area;
- Airside Area;
- Service and Cargo Areas; and
- Airport Buffers and Landscaping.

The 2016 EDR should describe the status and effectiveness of ground access changes, including roadway and parking projects, that consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on streets in adjacent neighborhoods.

Regional Transportation

The 2015 EDR describes activity levels at New England's regional airports in 2015 and provides an update on regional planning activities, including long-range transportation efforts. The New England region is anchored by Logan Airport and a system of 10 other commercial service, reliever, and general aviation (GA) airports (regional airports). In 2015, passenger traffic at the New England airports represented the highest passenger traffic level for the region since the economic downturn in 2008 and exceeded the historical peak of 48.0 million in 2005. The increase in the region's passenger traffic was largely driven by continued growth at Logan Airport. In 2015, the total number of air passengers utilizing New England's commercial service airports, including Logan Airport, increased by 4.1 percent from 46.8 million annual air passengers in 2014 to 48.7 million in 2015. Of the 48.7 million passengers, 68.6 percent of passengers (33.4 million) used Logan Airport compared to 67.6 percent (31.6 million) in 2014. Aircraft operations in the region remained flat in 2015, increasing 0.3 percent from 987,652 operations in 2014 to 991,041 operations in 2015.

Regional Airports

- 2016 regional airport operations, passenger activity levels, and schedule data within an historical context;
- Status of plans and new improvements as provided by the regional airport authorities;
- Role of the Worcester Regional Airport and Hanscom Field in the regional aviation system and Massport's efforts to promote these airports; and
- Ground access improvements at Massachusetts Regional Airport.

Regional Transportation System

- Massport's role in managing the regional transportation facilities within MassDOT;
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
- Report on metropolitan and regional rail initiatives and ridership.

Ground Access to and from Logan Airport

The 2015 EDR reports on transit ridership, roadways, traffic volumes, and parking for 2015. Specifically, the EDR states that Massport has continued to invest in and operate Logan Airport with a goal of increasing the number of passengers arriving by transit or other high occupancy vehicle (HOV) modes.

Massport remains in compliance with the Parking Freeze regulations which regulates the number of commercial and employee parking spaces allowed at Logan Airport (total limit of 21,088). Massport submits semi-annual compliance filings to MassDEP; March and September reports are provided in the 2015 EDR. As permitted (and encouraged) by the regulations, Massport has converted employee spaces to commercial spaces, within the overall limits.

The HOV/transit mode share at Logan Airport continues to rank at the top of U.S. airports. At the same time, private passenger vehicle trips continue to increase as air travel grows. Massport has indicated that as passenger levels have increased, the constrained parking supply at Logan Airport has resulted in an increase in pick-up and drop-off vehicle trips. Despite an increase in terminal area parking rates on July 1, 2014, daily parking demand more frequently approached the Parking Freeze cap in 2015. As described previously, Massport is proposing to construct additional parking to reverse this trend.

The Airport's gateway roadways are equipped with permanent traffic count stations, as part of the Airport-wide Automated Traffic Monitoring System (ATMS). These stations provide data on annual average daily traffic (AADT), annual average weekday daily traffic (AWDT), and annual average weekend daily traffic (AWEDT). The AADT (entering and departing Logan Airport via its gateway roadways) increased by 0.1 percent between 2014 and 2015. The change in average daily traffic can be attributed to: a 5.7-percent increase in air passenger activity in 2015; a 3.0-percent increase in taxi dispatches in 2015; and 1.1-percent decrease in parking activity (exits) in 2015. Historically, the highest AADT recorded at Logan Airport was in 2007, when AADT reached 110,690, AWDT was 119,200, and AWEDT was 91,320 that same year. These gateway traffic volumes corresponded to an annual air passenger level of 28,102,455 passengers. Current AADT and AWDT values are 2 and 5 percent (respectively) lower than current on-Airport traffic volumes despite a 19.0-percent increase in air passenger levels from 2007 to 2015.

On-Airport VMT is calculated based on the total number of miles traveled by all vehicles within the Logan Airport roadway system. In 2011 as detailed in the 2011 ESPR, Massport upgraded its modeling capabilities and began using an on-Airport VISSIM-10 model to estimate VMT. Based on the ATMS data, the change in on-Airport daily traffic volumes between 2014 and 2015 was negligible. However, 2015 evening peak hour gateway volumes grew by roughly 5 percent when compared to 2014. Additionally, a shift in gateway traffic entering/exiting the Airport from the Ted Williams Tunnel to the Sumner/Callahan Tunnels was noted. Daily traffic volumes in the Ted Williams Tunnel decreased by 8.4 percent (from 49,600 to 45,400 vehicles) while volumes in the Sumner/Callahan Tunnels increased by 19.5 percent (from 29,800 to 35,600 vehicles). Since 2000, the highest average weekday VMT estimated at Logan Airport was in 2007, when weekday VMT was modeled at 184,613.

The 2015 EDR describes improvements to support HOV access which include: Back Bay Logan Express pilot service (since May 2014); free MBTA Silver Line outbound (from Logan Airport) boardings; a 1,100-car parking garage at the Framingham Logan Express; reduced holiday travel parking rates at Logan Express facilities; increased parking rates on the Airport; and support for private coach bus and van operators.

As noted previously, TNCs such as Lyft and Uber that did not exist just a few years ago are becoming prominent providers of Logan Airport passenger ground access/egress. According to the NPC, this new mode is already beginning to have a dramatic impact on how passengers arrive and depart Logan Airport. Using TNC data collected since February 2017 when TNCs began picking up at Logan will provide a better indication of future ground access mode share than using limited 2016 information. The 2016 EDR should describe how this TNC data collection and analysis will be incorporated into the 2017 ESPR. NPC-8

The 2016 EDR should report on 2016 ground access conditions at the airport and provide a comparison of 2016 findings to those of 2015 for the following:

- Detailed description of compliance with Logan Airport Parking Freeze;
- High-occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Water Transportation, and Logan Express);
- Logan Airport Employee Transportation Management Association (Logan TMA) services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport vehicle miles traveled (VMT);
- Parking demand and management (including rates and duration statistics);
- Status of long-range ground access management strategy planning;
- Results of the 2016 Logan Airport Air Passenger Survey; and,
- Status of proposed connector to the Airport Station associated with the planned Terminal E Modernization Project.

The 2016 ESPR should address the following topics:

- Massport's target HOV mode share along with incentives;
- Non-Airport through-traffic;
- Massport's cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line, Silver Line, Water Transportation, and Logan Express;
- Report on Logan Express usage and efforts to increase capacity and usage;
- Progress on enhancing water transportation to and from Logan Airport;
- Report on results of ground access study; and
- Strategies for enhancing services and increasing employee membership in the Logan Airport TMA.

Noise

The 2015 EDR updated the status of the noise environment at Logan Airport in 2015, and described Massport's efforts to mitigate noise exposure and impacts. As noted previously, the implementation of RNAV has resulted in concentration of flight patterns over certain communities and significant increases in noise exposure. At the same time, the FAA introduced the AEDT for modeling noise and air quality. Massport did not submit AEDT modeling results for 2015. Noise was modeled using the FAA INM. Massport will use the AEDT for noise modeling for the 2016 EDR. NPC-9

Compared to 2000, overall operations were down by 23.6 percent while overall passengers were up by 20.6 percent; jet operations made up 86 percent of operations compared to 66 percent; and the number of people exposed to Day-Night Average Sound Level (DNL) 65 decibels (dB) has declined by 20.6 percent.

Compared to 2014, the 2015 DNL 65 dB noise contours were larger in most areas around the Airport due to changes in: (1) runway usage, primarily as a result of wind and weather conditions, (2) an increase in the number of nighttime operations, and (3) an increase in the number of overall operations. The overall number of people exposed to DNL values greater than or equal to 65 dB increased by 58.0 percent, from 8,922 people in 2014 to 14,097 people in 2015.

Runway use changes from 2014 to 2015 were the largest factor in the increase in the number of people exposed to DNL values greater than or equal to 65 dB. The DNL contour increased in East Boston and slightly in South Boston due to an increase in Runway 22R departures. Increased departures from Runway 22L also resulted in increases in Winthrop. Increased arrivals to Runways 22L and 27 at night contributed to increases in Revere and Winthrop. Unlike 2014, 2015 reflects almost a full year of the head-to-head night noise abatement procedures on Runway 15R-33L. While this reduces overall noise exposure by concentrating operations over water rather than over populated areas, it increases start-of-takeoff-roll noise in East Boston, north and west of the Runway 15R end. Lower use of Runway 4R for arrivals in 2015 resulted in a reduction in the contour south of the Airport.

An additional factor influencing noise contour changes in 2015 was a 5.7-percent increase in nighttime operations (from 48,056 nighttime operations in 2014 to 50,786 nighttime operations in 2015). This increase in overall operations and nighttime operations is still well below the peak of 54,038 annual operations at night reached in 1999. As airlines have expanded to new destinations, the number of commercial operations, and in turn the number of nighttime operations, has increased. In 2015, there was an increase of 7.5 nighttime operations per day compared to 2014.

The overall increase in operations was smaller than the increase in nighttime operations (2.5 percent overall versus 5.7 percent nighttime), but contributed to the expansion of the noise contours. The DNL and population levels in 2015 remain well below the peak levels reached in 1990 and are less than in the year 2000 when 17,745 people were exposed to DNL levels greater than or equal to DNL 65 dB. The 2015 DNL 65 dB contour is somewhat larger than the 2014 DNL 65 dB contour. Almost all of the residences exposed to levels greater than or equal to DNL 65 dB in 2015 have been eligible to participate in Massport's residential sound insulation program (RSIP).

To date, Massport has provided sound insulation for a total of 11,515 residential units, and will continue to seek funding for sound insulation for properties that are eligible and whose owners have chosen to participate. The 2016 EDR should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2016 conditions and provide a comparison to 2015 for the following:

- Fleet Mix, including Stage II, Recertified Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft;
- Nighttime operations;
- Runway utilization (report on aircraft and airline adherence with runway utilization goals);
- Preferential runway advisory system (PRAS) tracking; and
- Flight tracks.

The 2016 EDR will be based on AEDT for the first time. The initial analysis will provide a baseline from which to project noise conditions in the future.

Noise contours for 2016 should be developed using AEDT and compared to the most recent version of the INM which has been in place for all previous EDRs and ESPRs. The 2016 EDR should report on the following:

- Changes in annual noise contours and noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the models deployed;
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels; and
- Flight track monitoring noise reports.

The 2016 EDR should also report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide an update on the noise and operations monitoring system.

Air Quality/Emissions Reduction

The 2015 EDR provided an overview of airport-related air quality issues in 2015 and efforts to reduce emissions. The air quality modeling is based on aircraft operations, fleet mix characteristics, and airfield taxiing times combined with ground support equipment (GSE) usage, motor vehicle traffic volumes, and stationary source utilization rates. Total air quality emissions from all sources associated with Logan Airport are significantly lower than a decade ago.

In 2015, calculated emissions of volatile organic compounds (VOCs), oxides of nitrogen (NOx), carbon monoxide (CO), and particulate matter (PM) went up slightly compared to 2014. The increase is primarily due to the corresponding increase in aircraft landing and take offs (LTOs) and airfield taxi times. Total emissions of VOCs increased by 1 percent in 2015 to 1,188 kilograms (kg)/day compared to1,177 kg/day in 2014, which is still well below 1990 and 2000 levels. Total NOx emissions increased by approximately 5 percent in 2015, to 4,262 kg/day compared to 2014 levels of 4,040 kg/day. Massport's voluntary Air Quality Initiative (AQI) has tracked NOx emissions since the benchmark year of 1999. In the final year of this program (2015), total NOx emissions were 632 tons per year (tpy) lower than the 1999 benchmark. This represents a decrease of 27 percent in NOx emissions over the past 15 years. Between 1999 and 2015, the greatest reductions of NOx emissions were associated with aircraft, ground service equipment (GSE), and on-Airport motor vehicles at 17 percent, 71 percent, and 87 percent reductions, respectively. Massport has committed to continue to report on NOx emissions as part of the Logan Airport emissions inventory in future EDRs/ESPRs. Total CO emissions increased by about 3.5 percent in 2015 to 7,243 kg/day, from 6,987 kg/day in 2014; emissions in 2015 were still well below 1990 and 2000 levels. Total PM10/PM2.5 emissions also increased by about 3 percent in 2015 to 98 kg/day, from 95 kg/day in 2014.

The increases are associated with transportation and a significant portion is due to changes in modeling from MOBILE 6.2.03 to MOVES 2014a. Use of this program provides consistency with the State Implementation Plan (SIP) and MassDEP's methodologies.

The 2015 EDR contains a greenhouse gas (GHG) emissions inventory for the Logan Airport EDR. In 2015, total GHG emissions grew by 6 percent. As reported in past year EDRs, Logan Airport-related GHG emissions in 2015 comprised less than 1 percent of statewide totals.

The 2016 EDR should contain an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The 2016 EDR should also provide discussion on progress on the national and international levels to decrease air emissions. Massport has committed to use the FAA's AEDT model for air emissions modeling. The 2016 EDR should compare results to the most recent version of the Emissions Dispersion Modeling System (EDMS) that has been used in recent EDR filings. NPC-10

The EPA Motor Vehicle Emission Simulator (MOVES) tool will continue to be used to assess vehicular emissions on airport roadways. The 2016 EDR should include an emissions inventory for CO, NOx, VOCs, and PMs. It should also report on Massport and tenant alternative fuel vehicle programs and the status of Logan Airport air quality studies undertaken by Massport or others, as available.

The 2016 EDR should incorporate GHG emissions reporting. The 2015 EDR provided extensive data on GHG emissions. As required in the Certificate on the 2015 EDR, Massport should consider changes to the presentation of this data and normalizing it to support effective review and analysis. Massport should consult with the MEPA Office and DOER regarding presentation of GHG data in the 2016 EDR and subsequent ESPR. NPC-11

The 2016 EDR GHG emissions should continue to be quantified for aircraft, GSE, motor vehicles and stationary sources using emission factors and methodologies outlined in the *Greenhouse Gas Emissions Policy and Protocol* issued by EEA and the Transportation Research Board's *Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories* (Airport Cooperative Research Program (ACRP) Report 11, Project 02-06). The results of the 2016 GHG emissions inventory should be compared to the 2015 results.

Massport should also provide an update on its efforts to encourage the use of single engine taxiing under safe conditions. In addition, the 2016 EDR should provide an update on the feasibility of combined heat and power (CHP) use for Terminal E and updates to progress made in designing the energy systems for the facility.

Water Quality/Environmental Compliance

The 2015 EDR describes Massport's ongoing environmental management activities including National Pollutant Discharge Elimination System (NPDES) compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan (MCP), and tank management. Massport's primary water quality goal is to prevent or minimize pollutant discharges, thus limiting adverse water quality impacts of airport activities. Massport employs several programs to promote awareness of activities that may impact surface and groundwater quality. Programs include implementing best management practices (BMPs) for pollution prevention by Massport, its tenants, and its construction contractors; training of staff and tenants; and a comprehensive stormwater pollution prevention plan.

The 2016 EDR should identify any planned stormwater management improvements and report on the status of:

- NPDES Permit and monitoring results for Logan outfalls and the Fire Training Facility;
- Jet fuel usage and spills;
- MCP activities;
- Tank management;
- Update on the environmental management plan; and
- Fuel spill prevention.

Conclusion

Massport may prepare a 2016 EDR for submission in 2018 consistent with the Scope included in this Certificate. Massport has indicated that the 2016 EDR will be filed within the next few months. The 2016 EDR should include a draft Scope for the 2017 ESPR and identify a date by which the 2017 ESPR will be filed. I encourage Massport to target early 2019 for filing of the 2017 ESPR. NPC-12

March 9, 2018
Date

Matthew A. Beaton

No comments received.

MAB/ACC/acc

Copies of the Secretary of the Executive Office of Energy and Environmental Affairs Certificates issued for the Reporting Years 2016, 2015, 2014, 2012/2013, and 2011

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August 10, 2018

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
2016 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME	: 2016 Environmental Data Report (EDR)
PROJECT MUNICIPALITY	: Boston/Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: May 23, 2018

As Secretary of Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (MEPA) (M.G.L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00).

Logan Airport Environmental Review and Planning

The environmental review process for Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become, consistent with the objectives of the MEPA regulations, part of the Massachusetts Port Authority's (Massport) long-range planning process. The ESPR provides a "big picture" analysis of the environmental impacts associated with current and projected activity levels, and presents a comprehensive strategy to minimize impacts.

The ESPR is generally updated on a five-year basis. The most recent ESPR for the year 2011 was filed in April of 2013. Environmental Data Reports (EDRs) (formerly referred to as Annual Updates) are filed in the years between ESPRs.

EDRs consist of a status report and annual reporting on activity levels and associated environmental impacts at Logan Airport. ESPR's are also supplemented by (and ultimately incorporate) project-specific Environmental Impact Reports (EIR) that provide detailed analyses and mitigation commitments for proposed projects.

Through these reports, Logan Airport is subject to comprehensive and regular MEPA review, including opportunities for public comment on cumulative impacts. This regular updating and reporting on planning and cumulative impacts is unique among State Agencies. It reflects the challenge and complexity of managing and modernizing Logan Airport within a dense, urban area. It recognizes that the proximity of communities to the Airport warrants an enhanced level of public engagement and a concerted, long-term effort to minimize and mitigate impacts.

In February, 2018, Massport submitted a Notice of Project Change (NPC) regarding a request to shift the timing and sequence of the 2016 ESPR and 2017 EDR. The NPC indicated that 2016 was not an appropriate baseline year from which to forecast long-term operational and environmental conditions. The concern was based on changes associated with: (1) rapidly growing domestic and international passenger demand; (2) the formal introduction to Logan Airport of transportation network companies (TNC), such as Uber and Lyft; and (3) use of the Federal Aviation Administration's (FAA) Aviation Environmental Design Tool (AEDT) for noise and air quality modeling for 2016 reporting.

The sequence and timing for submitting ESPRs and EDRs had been adjusted previously based on consultation between Massport and the Executive Office of Energy and Environmental Affairs (EEA). Most recently, with EEA approval, Massport deferred submittal of the 2011 ESPR by two years based on the regional and national economic downturn experienced in the mid- to late-2000s. In a certificate on March 9, 2018 I granted the request to submit a 2016 EDR in lieu of the ESPR and issued the Scope for the EDR.

In 2016, passenger activity at Logan Airport has continued to grow faster than previous forecasts. A significant portion of growth in passengers is driven by an increase in demand for international air service. Massport has responded to this demand by providing new service to international destinations and expanding service to existing destinations. As passenger levels have increased, aircraft operations remain significantly below the peak of 507,449 operations experienced in 1998 when Logan Airport served 26.5 million passengers. The reduction of over 130,000 annual flight operations combined with transition towards newer and larger aircraft with improved environmental performance and operational efficiencies, have supported passenger growth while limiting environmental impacts.

The long-term trend is towards more efficient operations and significant reductions in overall environmental impacts. Although environmental impacts are significantly lower

compared to 1998 when operations were highest, comparison of activity level and environmental impact data to 2014 and more recent EDRs identifies increases in noise exposure, air emissions and traffic. These increases were not forecast in the 2011 ESPR. The increases are associated with passenger growth, changes in flight patterns and changes in modeling of noise and air quality. The 2016 EDR indicates that terminals, roadways and parking facilities are strained by these increases.

Logan Airport passenger ground access is changing rapidly with the use of TNCs for departures and arrivals at the Airport. Massport has been collecting TNC data since 2017 when TNCs were authorized to pick up customers from the airport. The 2016 EDR provides partial data for 2016 and identifies effects of TNCs. The 2017 ESPR will provide improved data and assessment of ground access trends.

The most significant change since 2011 is the introduction by the FAA of changes to area navigation (RNAV) procedures. The RNAV program has been implemented throughout the country and its primary purpose is to increase safety and operational efficiency. The implementation of several of these procedures has resulted in concentrations of flight patterns over certain communities and significant increases in noise exposure.

The impact of the RNAV program is emphasized in comment letters received on the 2016 EDR and also during review of specific projects, including the Terminal E Modernization Project (EEA# 15434). Massport and the FAA signed a Memorandum of Understanding (MOU) in 2017 to frame a new process for analyzing opportunities to incrementally reduce noise through changes or amendments to Performance Based Navigation, including RNAV procedures.

The 2016 EDR introduces emissions and noise modeling based on AEDT rather than the Integrated Noise Model (INM). Massport had deferred use of the AEDT until Massport made adjustments.

Subsequent ESPRs and EDRs will document potential impacts and trends and propose measures to avoid, minimize and mitigate environmental impacts.

Review of the 2016 EDR and Scope for the 2017 ESPR

The 2016 EDR identifies passenger activity and aircraft operational levels; provides updates on projects, environmental management plans and the status of project mitigation; includes a description and analysis of changes which will influence results and projections of the 2017 ESPR; and it includes a Scope for the 2017 ESPR.

The 2017 ESPR is an opportunity to update the cumulative impacts of passenger growth and associated ground and aircraft operations based on revised forecasts, documented trends and environmental impacts. The next ESPR will analyze calendar year 2017 and provide projections through 2035. It should follow the general format of the 2011 ESPR and include an Executive Summary (translated into Spanish) and Introduction, similar to previous ESPRs and EDRs. A-1 A-2

The 2017 ESPR must include information on the environmental policies and planning that form the context of environmental reporting, technical studies, and environmental mitigation initiatives against which projects at Logan Airport can be evaluated. This should include identification of the cumulative effects of Logan Airport operations and activities, compared to previous years, as appropriate. The results of the Logan Airport Air Passenger Ground Access Survey and the Long-term Parking Management Plan should inform transportation planning and strategies to achieve the HOV mode share goal. A-3 A-4 A-5

The ESPR must include copies of all ESPR and EDR Certificates and a distribution list for the 2017 ESPR (indicating those receiving documents, CDs, or Notices of Availability). Supporting technical appendices should be provided as necessary. A-6 A-7

Response to Comments

The Response to Comments section should address all of the substantive comments on the 2016 EDR, and other Certificates for Logan Airport that reference EDR/ESPR documentation (e.g. Logan Airport Parking Project, Terminal E). To ensure that the issues raised by commenters are addressed, the 2017 ESPR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended to, and shall not be construed to, enlarge the scope of the 2017 ESPR beyond what has been expressly identified in this Certificate. I recommend that the Massport continue to use the format from the 2016 EDR. The Responses to Comments should not reference a section of the 2017 ESPR unless they are directly responsive to the comment. Common themes that should be addressed throughout the ESPR and in the Responses to Comments include noise (modeling of noise contours and noise abatement) and emissions reduction issues. The 2017 ESPR should include sufficient information to address comments on traffic, air quality and public health which are common concerns of commenters. A-8 A-9 A-10 A-11 A-12

Activity Levels

Air traffic activity levels at Logan Airport are the basis for the evaluation of noise, air quality, and ground access conditions associated with the Airport. In this section, current activity levels at the Airport are compared to prior-year levels, and historical passenger and operations trends at Logan Airport dating back to 2000 which is the year Massport approved an Environmental Management Policy. The total number of air passengers increased by 8.5 percent to 36.3 million in 2016, compared to 33.4 million in 2015. The 2016 passenger level represents a record high for Logan Airport.

Passenger aircraft operations accounted for 90.4 percent of total aircraft operations in 2016. The total number of aircraft operations at Logan Airport increased by 4.9 percent from 372,930 in 2015 to 391,222 in 2016. Aircraft operations continue to increase from 2010 levels and remain below the 487,996 operations in 2000 and the historical peak of 507,449 in 1998.

Air carrier efficiency continued to improve in 2016 as the average number of passengers per aircraft operation at Logan Airport grew from 89.7 in 2015 to 92.8 in 2016. The increasing number of passengers per flight reflects a shift away from smaller aircraft and rising load factors

as airlines continue to focus on capacity control and improvements in efficiency. This trend is indicative of the industry-wide shift toward higher aircraft load factors and an increase in the number of domestic and international destinations. Annual domestic passenger activity levels increased from 27.8 million in 2015 to 29.6 million in 2016, a 6.4 percent increase. International passenger demand continues to increase at a faster rate than domestic passenger demand. International passengers increased from 5.5 million in 2015 to 6.6 million in 2016, a 19 percent increase. The 2016 EDR indicates that strong international passenger growth was driven by the economic attractiveness of the metropolitan Boston region and the strength of Boston as an origin and destination market. In response to regional demand for international service, new non-stop services were introduced by a number of airlines including Air Berlin, Norwegian Air Shuttle, Qatar Airways, Scandinavian Airlines, and TAP Air Portugal. New international destinations from Logan Airport in 2016 included Dusseldorf, London Gatwick, Doha, Copenhagen, and Lisbon.

Passenger activity has continued to grow faster than forecasts provided in the 2016 EDR. It is expected that Logan Airport will reach 40 million annual passengers by 2019. The ESPR should describe how Massport will achieve long-standing goals to reduce overall operating and environmental impacts at the airport as passengers and, in particular, international passengers increase. A-13 Discussion of passenger and activity levels and planning/mitigation to address impacts of that growth, in particular air and noise emissions, should be a significant emphasis of the ESPR. A-14

The 2017 ESPR should report on: A-15

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
- Domestic and international passenger activity levels;
- Cargo and mail volumes;
- Comparison of 2017 operations and passenger activity levels to 2016 activity levels; and
- National aviation trends compared to Logan Airport trends.

The 2017 ESPR should update the Logan Airport long-term passenger forecast to reflect growth trends at Logan Airport and revised expectations for the local/national/international economy. A-16 Planning and impact sections will be based on forecasting for the next five years through 2035. It should address methodologies and assumptions used in the analysis, including anticipated changes to fleet mix changes and other trends in the aviation industry. A-17 It should also provide: A-18

- Updated forecasts for passenger volume, aircraft operations, and fleet mix;
- A comparison of 2017 operations to historic trends and 2035 forecasts; and
- A comparison of forecast activity levels to Massport forecasts from previous ESPRs, FAA forecasts and the U.S. aviation industry.

Sustainability at Logan Airport

The 2016 EDR described Massport's airport wide sustainability goals as identified in the EMP and 2016 Sustainability Management Plan (SMP). The SMP identifies efforts to promote,

coordinate and integrate sustainability Airport-wide. Progress towards achieving these goals was addressed in the 2016 EDR. The 2017 ESPR should update progress on these goals. A-19

Climate Change

Massport assets and Logan Airport, in particular, are critical infrastructure and play an important role in the economy. As recognized in Governor Baker's recent Executive Order 569 "Establishing an Integrated Climate Change Strategy for the Commonwealth" and a suite of other state and municipal initiatives, the impacts of climate change must be an important consideration for development across the state. Climate change presents a serious threat to the environment and the Commonwealth's residents, communities and economy. The EO indicates that extreme weather events associated with climate change present a serious threat to public safety and the lives and property of our residences. The recent flooding and storm damage caused by two storms in early March underscore these risks and the importance of adaptation and resiliency planning.

The EO also identifies the transportation sector as a significant contributor to GHG emissions in the Commonwealth and the only sector in which GHG emissions are increasing. In 2017, EEA and the Massachusetts Department of Transportation (MassDOT) conducted a number of transportation listening sessions throughout the Commonwealth to inform development of strategies and programs to reverse the growth in this sector.

Consistent with EO 569, the Massachusetts State Hazard Mitigation and Climate Adaptation Plan and the Massachusetts Energy Plan will be released in September. The ESPR should address the project's consistency with these plans. A-20

Massport has begun reporting on GHG emissions and, in recognition of the potential effects of climate change on Massport infrastructure and operations, Massport initiated a Disaster and Infrastructure Resiliency Planning (DIRP) Study.

GHG emissions

The 2016 EDR contains a greenhouse gas (GHG) emissions inventory for the Logan Airport EDR. The 2016 EDR presented emissions and energy data normalized by passenger use and building area. GHG emissions associated with buildings and transportation were presented as pounds of CO_2 per passenger. GHG emissions for buildings were presented as pounds of CO_2 per sf per year. Energy use for buildings were presented as kBtu per sf per year. Ten years of data was provided in the 2016 EDR for each of these. The analysis showed that Massport has reduced emissions per passenger across its operations by 34 percent in the last decade. Building energy use has been reduced 23 percent while building emissions have been reduced 43 percent.

The 2017 ESPR should incorporate GHG emissions reporting consistent with that provided in the 2016 EDR which was normalized to support effective review and analysis. A-21 In addition, Massport should ensure that only conditioned (heated and cooled, enclosed buildings) building areas are included in energy use and emission intensity calculations, report input energy components (oil, gas, electricity) and central plant data and clarify how renewables are A-22

accounted in the analysis. Massport should consult with the MEPA Office and the Department of Energy Resources (DOER) regarding presentation of GHG data in the 2017 ESPR and subsequent EDRs. A-23

The 2017 ESPR GHG emissions should continue to be quantified for aircraft, GSE, motor vehicles and stationary sources using emission factors and methodologies outlined in the *Greenhouse Gas Emissions Policy and Protocol* issued by EEA and the Transportation Research Board's *Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories* (Airport Cooperative Research Program (ACRP) Report 11, Project 02-06). The results of the 2017 GHG emissions inventory should be compared to the 2016 results. A-24

Adaptation and Resiliency

A particular concern for Massport is the effect of sea level rise and projected increases in the severity and frequency of storms. The DIRP Study includes Logan Airport, the Port of Boston, and Massport's waterfront assets in South and East Boston. It includes a hazard analysis; modeling of projected sea-level rise and storm surge; temperature and precipitation projections; and anticipated increases in extreme weather events.

In addition to the DIRP Study and its related initiatives, Massport has completed an Authority-wide risk assessment; issued a Floodproofing Design Guide; and developed a resilience framework to provide consistent metrics for short- and long-term planning and protection of its critical facilities and infrastructure. Massport's Floodproofing Design Guide was updated in April 2016. Plans were also introduced in 2015 that included the deployment of temporary flood barriers to protect up to 12 locations of critical infrastructure in the event of severe weather.

The 2017 ESPR should provide a summary of the DIRP Study and identify which recommendations Massport will implement in the short term and long term. A-25

Mitigation

The 2016 EDR identifies the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review. The 2017 ESPR will address cumulative, Airport-wide impacts. A-26 The 2017 ESPR should update the status of mitigation commitments for recent projects such as the Terminal E Modernization Project and the Logan Airport Parking Project as well as projects previously included in the EDRs. A-27

Planning

The Airport Planning section describes the status of projects underway or completed at Logan Airport by the end of 2016. Specific topics include terminal area projects, service area projects, buffer/open space projects, Airport parking projects, airside area projects, high occupancy vehicle (HOV) improvements, and Airport-wide projects. Project updates include:

- *Terminal E Renovation and Enhancements Project*: This project includes interior and exterior improvements at Terminal E to accommodate regular service by wider and

longer Group VI aircraft. The project reconfigured three gates to accommodate Group VI aircraft (including the Airbus A380 and Boeing 747-8 primarily used by international air carriers) and passenger holdrooms to accommodate larger passenger loads associated with these aircraft. Construction was completed in early 2017.

- *Terminal E Modernization Project*: This project will accommodate existing and long range forecasted demand for international service. The expansion will add the three gates approved in 1996 (International Gateway West Concourse project, EEA #9791), which were never constructed, and an additional two to four additional new gates in an extended concourse. A key feature of this project is the first direct pedestrian connection from the MBTA Blue Line Airport Station to the terminal complex at Logan Airport. It will also include roadway improvements to facilitate access to the terminal. Phase 1 has been permitted and is in the final design stage.

- *Terminal C to E Airside Connector:* This project provides a new post-security connection between Terminals C and E on the Departures Level and provides improved passenger circulation within the post-security concourses, additional holdroom space at Terminal E, reconfigured office space, concessions and concessions support, and a new consolidated location for escalators and stairs. The project was completed in May 2016.

- *Terminal B Airline Optimization Project:* Massport is upgrading its facilities on the Pier B side of Terminal B to meet airlines' needs (primarily reflecting the merger of American Airlines and US Airways) and to provide facilities that improve the passenger traveling experience. Similar improvements have been implemented with the recent renovations and improvements at Terminal B, Pier A. Planned improvements include an enlarged ticketing hall; improved outbound bag area; and expanded bag claim hall, concession areas and holdroom capacity at the gate. Final design is complete and construction is underway. Construction is expected to be complete in early 2019.

- *Hangar Projects:* Architectural design commenced in December 2010 for two hangar upgrades in the North Cargo Area (NCA). The renovated JetBlue Airways hangar opened in 2012. The American Airlines hangar, formerly occupied by Northwest Airlines, was refurbished in 2013. Demolition of the former American Airlines hangar (Hangar 16) commenced in 2014 and was completed in August 2016.

- *Logan Airport Parking Project*: This project includes the construction of up to 5,000 new commercial parking spaces to reduce trip generation associated with increases in passenger drop-off and pick-up at the airport. The Certificate on the ENF was issued on May 5, 2017 and included a Scope for the Draft Environmental Impact Report (DEIR). The project required an amendment to the Logan Airport Parking Freeze Regulations (310 CMR 7.30). Amendments to the regulations were promulgated in 2017. The DEIR is under development and will identify the number of spaces, location of spaces and planned construction phasing.

- *Maintenance of Airport Edge Buffer Areas and Parks:* The 2016 EDR provides updates on the planning, construction, and maintenance of four Airport edge buffer areas and two

parks along Logan Airport's perimeter. As of 2016, the Bayswater Buffer, Navy Fuel Pier Buffer, SWSA Buffer Phase 1 and the SWSA Buffer Phase 2 have been completed. The Neptune Road Airport Edge Buffer opened in 2016. These buffers and parks include 3.3 miles and more than 33 acres of green space developed or managed by Massport.

The 2017 ESPR should continue to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport must accommodate and guide tenant development. A-28

The ESPR should describe the status of planning initiatives for the following areas:

- Roadways and Airport Parking;
- Terminal Area;
- Airside Area;
- Service and Cargo Areas; and
- Airport Buffers and Landscaping.

A-29

The 2017 ESPR should also indicate the status of long-range planning activities, including the status of public works projects implemented by other agencies within the boundaries of Logan Airport. A-30 The ESPR should identify the status and assess effectiveness of ground access changes, including roadway and parking projects, that consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on streets in adjacent neighborhoods. A-31

Regional Transportation

The 2016 EDR describes activity levels at New England's regional airports in 2016 and provides an update on regional planning activities, including long-range transportation efforts. The New England region is anchored by Logan Airport and a system of 10 other commercial service, reliever, and general aviation (GA) airports (regional airports). In 2016, passenger traffic at the New England airports represented the highest passenger traffic level for the region since the economic downturn in 2008. The increase in the region's passenger traffic was largely driven by continued growth at Logan Airport. In 2015, the total number of air passengers utilizing New England's commercial service airports, including Logan Airport, increased by 6.4 percent, from 48.8 million air passengers in 2015 to 51.9 million air passengers in 2016. Of the 51.9 million passengers using New England's commercial service airports in 2016, 69.9 percent of passengers (36.3 million) used Logan Airport compared to 68.6 percent (33.5 million) in 2015.

The 2017 ESPR should report on:

Regional Airports

- 2017 regional airport operations, passenger activity levels, and schedule data within an historical context;
- Status of plans and new improvements as provided by the regional airport authorities; A-32
- Role of the Worcester Regional Airport and Hanscom Field in the regional aviation system and Massport's efforts to promote these airports; and

- Ground access improvements at Massachusetts Regional Airports.

Regional Transportation System

- Massport's role in managing the regional transportation facilities within MassDOT; A-32
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
- Report on metropolitan and regional rail initiatives and ridership.

Ground Access to and from Logan Airport

The 2016 EDR reports on transit ridership, roadways, traffic volumes, and parking for 2016. Specifically, the EDR states that Massport has continued to invest in and operate Logan Airport with a goal of increasing the number of passengers arriving by transit or other HOV modes. The 2016 EDR provides a discussion of ground access modes and trip generation associated with each mode including: (1) transit and shared-ride HOV services; (2) drive to Logan Airport and park; or (3) drop-off/pick-up mode, which can involve a private vehicle, taxi, limousine, or TNCs.

Use of mobile application ride-booking services, such as Uber and Lyft, are increasingly becoming a mode of choice for ground access at Logan Airport. As noted previously, in 2017 Massport began allowing TNCs to pick-up arriving air passengers. The 2016 EDR provides data from the 2016 Logan Airport Air Passenger Ground-Access Survey that shows increased use.

Massport remains in compliance with the Parking Freeze regulations which regulates the number of commercial and employee parking spaces allowed at Logan Airport. Massport submits semi-annual compliance filings to MassDEP; March and September reports are provided in the 2016 EDR. As permitted (and encouraged) by the regulations, Massport has converted employee spaces to commercial spaces, within the overall limits.

The HOV/transit mode share at Logan Airport continues to rank at the top of U.S. airports. The 2016 EDR describes a multi-pronged trip reduction strategy to reduce the number of private vehicles that access Logan Airport and, in particular, the drop-off/pick-up modes. Measures implemented in 2016 by Massport to increase HOV use include a blend of initiatives related to pricing (incentives and disincentives), service availability, service quality, marketing, and traveler information.

At the same time, private passenger vehicle trips continue to increase as air travel grows. Massport has indicated that as passenger levels have increased, the constrained parking supply at Logan Airport has resulted in an increase in pick-up and drop-off vehicle trips. Despite an increase in terminal area parking rates on July 1, 2014, daily parking demand more frequently approached the Parking Freeze cap in 2015. As described previously, Massport is proposing to construct additional parking to reverse this trend. The 2016 EDR contained an outline of the proposed ground access study required by the Parking Freeze amendments. The results recommendations of this study will be presented in the 2017 ESPR. A-33

Beginning with the 2017 ESPR, Massport will introduce a new definition for high occupancy vehicle (HOV) modes that will provide more accuracy. Under the current system, Massport identifies all taxis as non-HOV and TNCs as non-HOV and all black car limousines as HOV. Going forward, Massport will estimate HOV and non-HOV breakdowns for taxis, livery services, and TNCs based on whether there is more than one passenger. Consistent with the directive identified in the Certificate on the ENF for the Logan Airport Parking Project, and through negotiations with CLF, Massport has committed to a goal of 35.5 percent HOV by 2022 and 40 percent by 2027. A-34

The Airport-wide Automated Traffic Monitoring System (ATMS) includes permanent traffic count stations at the Airport's gateway roadways. These stations provide data on annual average daily traffic (AADT), annual average weekday daily traffic (AWDT), and annual average weekend daily traffic (AWEDT). The AADT (entering and departing Logan Airport) increased by increased by 5.4 percent between 2015 and 2016. The change in average daily traffic can be attributed to: an 8.5-percent increase in air passenger activity in 2016; a 5.1-percent increase in taxi dispatches in 2016; and, the impact of TNCs (although this has not been quantified).

On-Airport VMT is calculated based on the total number of miles traveled by all vehicles within the Logan Airport roadway system. VMT is used to calculate motor vehicle air quality emissions, and it is also one indication of the levels of traffic on roadways in specific areas and at specific times. In 2011 as detailed in the 2011 ESPR, Massport upgraded its modeling capabilities and began using an on-Airport VISSIM-10 model to estimate VMT. The adjustment factors for the 2016 VMT calculations were determined by using 2011 to 2016 gateway, airport roadway, and parking volume averages.

The change in average weekday VMT between 2015 and 2016 was approximately 4.8 percent, despite higher increases in passenger levels (8.5 percent) and traffic volume (5.4 percent) during the same time period. Since 2000, the highest average weekday VMT estimated at Logan Airport was 184,613 in 2007. According to the 2016 EDR weekday VMT calculations remain about 4.4 percent lower than 2007, despite the 29.1 percent increase in air passenger traffic during the same time period. The 2016 EDR attributes this to the promotion of HOV modes. However, the 2016 EDR does not present a quantifiable comparison between VMT values prior to 2011 because the previous model was limited to terminal access roads while the current VMT model includes a larger on-Airport study area.

The 2016 EDR describes improvements to support HOV access which include: Back Bay Logan Express pilot service (since May 2014); free MBTA Silver Line outbound (from Logan Airport) boardings; a 1,100-car parking garage at the Framingham Logan Express; reduced holiday travel parking rates at Logan Express facilities; increased parking rates on the Airport; and support for private coach bus and van operators. In 2015, Massport acquired the 20-acre site that Massport previously leased for Braintree Logan Express. The site provides parking for 1,800 cars. The Braintree had a ridership of 655,158 passengers trips in 2016, representing 36 percent of the entire Logan Express system ridership. Approximately half of the Braintree Logan Express riders are Logan Airport employees. 2016 ridership for the Back Bay Logan Express totaled 216,329 passengers, an average of about 600 riders per day. In 2015, the service average

was 805 riders per day, with a total of 290,796 passengers. The EDR attributes the 26 percent reduction in ridership to the re-opening of the Government Center Station in March 2016 and the ending of free fares for riders with an MBTA pass and reduced fares for all others.

The 2017 ESPR should report on 2017 ground access conditions at the airport and provide a comparison to 2016 for the following: A-35

- Description of compliance with Logan Airport Parking Freeze;
- High-occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Water Transportation, and Logan Express);
- Logan Airport Employee Transportation Management Association (Logan TMA) services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport vehicle miles traveled (VMT);
- Parking demand and management (including rates and duration statistics);
- Status of long-range ground access management strategy planning;
- Results of the 2016 Logan Airport Air Passenger Ground Access Survey; and,
- Status of proposed connector to the Airport Station associated with the planned Terminal E Modernization Project.

The chapter should present a discussion of analytical methodologies and assumptions for the planning horizon year (2035) for traffic volumes, on-airport VMT and parking demand. A-36

The 2017 ESPR should address the following topics: A-37

- Target HOV mode share and incentives;
- Non-Airport through-traffic;
- Cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line, Silver Line, Water Transportation, and Logan Express;
- Report on efforts to increase capacity and use of Logan Express;
- Progress on enhancing water transportation to and from Logan Airport;
- Results and recommendations of the ground access study Long-term Parking Management Plan required by the Parking Freeze amendments; and
- Strategies for enhancing services and increasing employee membership in the Logan Airport TMA.

Noise

The 2016 EDR updated the status of the noise environment at Logan Airport in 2016, and described Massport's efforts to mitigate noise exposure and impacts. The implementation of the aRea NAVigation (RNAV) Pilot study being jointly undertaken by FAA and Massport has resulted in concentration of flight patterns over certain communities and significant increases in noise exposure. The effects of this program are identified as significant concerns in the majority of comment letters.

The 2016 EDR provides noise modeling results from the AEDT (version 2c, Service Pack 2). The model requires detailed operational data as inputs for noise calculations, including numbers of operations per day by aircraft type and by time of day, which runway for each arrival and for each departure, and flight track geometry for each track. INM results are provided for comparison. The 2016 EDR also presents summaries of the 2016 operational data used in the noise modeling, as well as the resultant annual Day-Night Average Sound Level (DNL) noise contours, a comparison of the modeled results with measured levels from the noise monitoring system, and estimates of the population residing within various increments of noise exposure in 2016. Both FAA and the U.S. Department of Housing and Urban Development consider DNL exposure levels above 65 decibels (dB) to be incompatible with residential land use. The 2016 EDR identifies which noise abatement measures are being employed, describes the RNAV Pilot study being jointly undertaken by FAA and Massport, and provides a summary of the Boston Logan Airport Noise Study (BLANS).

Annual aircraft operations in 2016 increased from 372,930 operations in 2015 to 391,222 in 2016, a 4.9-percent increase. Passenger volumes are at an all time high increasing from 33.4 million passengers in 2015 to 36.3 million in 2016, an increase of 8.5 percent. Commercial traffic increased from 344,764 to 360,400, a 4.2-percent increase compared to 2015. In 2016, operations continued to shift from the smaller Regional Jet (RJ) aircraft to larger aircraft on many routes, increasing the number of passengers carried per operation.

Differences between measured and modeled values had narrowed in recent years as the processes were refined. Introduction of the AEDT has increased the differences. Runway use changes from 2015 to 2016 were the largest factor influencing noise exposure in 2016. The one-month closure of Runway 4L-22R for resurfacing caused air traffic to shift to Runway 15R-33L and Runway 9-27, and these changes in runway use are reflected in the noise contour changes presented in the 2016 EDR. An additional factor influencing noise contour changes in 2016 was an increase in nighttime operations, from 50,786 in 2015 to 55,499 in 2016.

Population exposed to DNL levels greater than or equal to DNL 65 dB noise levels for 2016 was 16,985 based on the legacy INM model, and 7,450 using the next-generation AEDT model. In 2016, noise complaints more than doubled. Massport received 38,045 noise complaints from 83 communities compared to 17,685 in 2015 from 84 communities.

The increase in complaints continues to be primarily related to the FAA's RNAV departure procedures, which concentrate flight tracks along narrower corridors. All complaints have been forwarded to FAA. The 2016 EDR also provides an update on the MOU between Massport and FAA to frame the process for analyzing opportunities to reduce noise through changes or amendments to Performance Based Navigation (PBN), including RNAV. Massport is working with the FAA to develop test projects designed to help address the concentration of noise from the PBN. The 2017 ESPR must provide strategies to address noise impacts which are expressed in numerous comments received on the 2016 EDR. A-38

To date, Massport has provided sound insulation for a total of 11,515 residential units exposed to levels greater than or equal to DNL 65 dB, and will continue to seek funding for sound insulation for properties that are eligible and whose owners have chosen to participate. The 2017 ESPR should provide an overview of the environmental regulatory framework A-39

affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2017 conditions and provide a comparison to 2016 for the following: A-39

- Fleet Mix, including Stage II, Recertified Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft;
- Nighttime operations; A-40
- Runway utilization (report on aircraft and airline adherence with runway utilization goals);
- Preferential runway advisory system (PRAS) tracking; and
- Flight tracks.

The 2017 ESPR should report on the following:

- Changes in annual noise contours and noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the models deployed; A-41
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels; and
- Flight track monitoring noise reports.

The 2017 ESPR should also report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide an update on the noise and operations monitoring system. A-42

Air Quality/Emissions Reduction

The 2016 EDR provided an overview of airport-related air quality issues in 2016 and efforts to reduce emissions. The air quality modeling is based on aircraft operations, fleet mix characteristics, and airfield taxiing times combined with ground support equipment (GSE) usage, motor vehicle traffic volumes, and stationary source utilization rates. Total air quality emissions from all sources associated with Logan Airport are significantly lower than a decade ago.

In 2016, calculated emissions of volatile organic compounds (VOCs), oxides of nitrogen (NOx), carbon monoxide (CO), and particulate matter (PM) went up slightly compared to 2015. The increase is primarily due to the corresponding increase in aircraft landing and take offs (LTOs), airfield taxi times, and modeling differences between the AEDT model and the Emissions Dispersion Modeling System (EDMS) which had been used in prior EDR filings. VOC, NOx, CO and PM were all is influenced by the increase in aircraft operations. In addition, the AEDT model estimates growth in the proportion of aircraft emissions for VOCs, NOX, and CO in comparison to EDMS. However, the opposite was true for PM10/ PM 2.5 where the EDMS model estimates a higher PM10/ PM 2.5 than the AEDT model. Total modeled emissions of VOCs increased by 7.7 percent in 2016 to 1,280 kilograms (kg)/day, compared to 1,188 kg/day in 2015. Modeled NOx emissions increased by 24.4 percent in 2016 to 5,300 kg/day compared to 4,262 kg/day in 2015. Total modeled CO emissions increased by 1.5 percent in

2016 to 7,350 kg/day compared to 7,243 kg/day in 2015. Total PM10/PM2.5 emissions have decreased by about 2 percent in 2016 to 96 kg/day from 98 kg/day in 2015.

The 2017 ESPR should contain an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. A-43 The 2017 ESPR should also provide discussion on progress on the national and international levels to decrease air emissions. A-44 Massport should continue to use the FAA's AEDT model for air emissions modeling as was presented in the 2016 EDR. A-45

The EPA Motor Vehicle Emission Simulator (MOVES) tool will continue to be used to assess vehicular emissions on airport roadways. The 2017 ESPR should include a mobile sources emissions inventory for CO, NOx, VOCs, and PMs. A-46 It should also report on Massport and tenant alternative fuel vehicle programs and the status of Logan Airport air quality studies undertaken by Massport or others, as available. A-47

Commenters continue to express concern regarding ultrafine particulates (UFPs). The 2016 EDR includes information on the status of UFP review by the Environmental Protection Agency (EPA) and an update on associated research and monitoring. The ESPR should include updated information regarding potential regulation, research and monitoring of UFPs. A-48

Massport should also provide an update on its efforts to encourage the use of single engine taxiing under safe conditions. A-49 In addition, the 2017 ESPR should provide an update on the feasibility of combined heat and power (CHP) use for Terminal E and updates to progress made in designing the energy systems for the facility. A-50

Water Quality/Environmental Compliance

The 2016 EDR describes Massport's ongoing environmental management activities including National Pollutant Discharge Elimination System (NPDES) compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan (MCP), and tank management. Massport's primary water quality goal is to prevent or minimize pollutant discharges, thus limiting adverse water quality impacts of airport activities. Massport employs several programs to promote awareness of activities that may impact surface and groundwater quality. Programs include implementing best management practices (BMPs) for pollution prevention by Massport, its tenants, and its construction contractors; training of staff and tenants; and a comprehensive stormwater pollution prevention plan.

The 2017 ESPR should identify any planned stormwater management improvements and report on the status of:

- NPDES Permit and monitoring results for Logan outfalls and the Fire Training Facility;
- Jet fuel usage and spills;
- MCP activities; A-51
- Tank management;
- Update on the environmental management plan; and
- Fuel spill prevention.

Conclusion

Massport may prepare a 2017 ESPR for submission consistent with the Scope included in this Certificate. I encourage Massport to target early 2019 for filing of the 2017 ESPR.

August 10, 2018
Date

Matthew A. Beaton

Comments received:

06/17/2018	Gillian Anderson
06/18/2018	Luke Preisner
06/21/2018	James Morgan
06/22/2018	Nancy Timmerman
07/02/2018	Peter Houk
07/23/2018	Town of Milton, Board of Selectmen
07/31/2018	Cindy Christiansen
07/31/2018	GreenRoots
07/31/2018	Astrid Weins
07/31/2018	Dawn Quirk and Julia Wallerce
07/31/2018	Airport Impact Relief, Inc.
08/03/2018	Department of Energy Resources

MAB/ACC/acc

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February 17, 2017

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
2015 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME	: 2015 Environmental Data Report
PROJECT MUNICIPALITY	: Boston/Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: December 21, 2016

As Secretary of Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (MEPA) (M.G.L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00).

The environmental review process for Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become, consistent with the objectives of the MEPA regulations, part of the Massachusetts Port Authority's (Massport) long-range planning process. The ESPR provides a "big picture" analysis of the environmental impacts of current and anticipated levels of activities, and presents an overall strategy to minimize impacts. The ESPR is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments for project-specific Environmental Impact Reports (EIR). The ESPR is generally updated on a five-year basis; the most recent ESPR for the year 2011 was filed in April of 2013. Environmental Data Reports (EDRs) (formerly referred to as Annual Updates) are filed in the years between ESPRs.

Through these reports, Logan Airport is subject to comprehensive and regular MEPA review, including opportunities for public comment on cumulative impacts. This regular updating and reporting on planning and cumulative impacts is unique among State Agencies. It reflects the challenge and complexity of managing and modernizing Logan Airport within a dense, urban area. It recognizes that the proximity of communities to the Airport warrants an enhanced level of public engagement and a concerted, long-term effort to minimize and mitigate impacts.

The 2015 EDR is the subject of this review and includes the Scope for the 2016 ESPR. The 2016 ESPR is an opportunity to update the cumulative impacts of passenger growth and associated ground and aircraft operations based on revised forecasts. The 2016 ESPR will document trends and environmental impacts and will update and revise environmental management plans to address impacts. A-1
The next ESPR will analyze calendar year 2016 and provide projections through 2035. A-2

Subsequent ESPRs and EDRs will also update the cumulative impacts of passenger growth and associated ground and aircraft operations based on revised forecasts and will update and revise environmental management plans to address impacts. Future submittals will continue to document potential impacts and trends and propose measures to implement the broad goal of maintaining or reducing Logan's overall environmental impacts, even as annual passenger volumes rise. I would like to acknowledge Massport's concerted outreach effort over the last year, including the creation of the Logan Airport Impact Advisory Group (IAG) to solicit comment and to identify and prioritize projects and programs of significance to the IAG.

The 2015 EDR provides a comprehensive, cumulative analysis of the effects of all Logan Airport activities based on actual passenger activity and aircraft operational levels, provides updates on projects, environmental management plans and the status of project mitigation. The 2016 ESPR will report on updated passenger activity levels, aircraft operations forecasts, and environmental conditions forecasts. A-3

Review of the 2015 EDR and
Scope for the 2016 ESPR

In 2015, Logan Airport served an all-time high of 33.4 million passengers, exceeding the 2014 historic peak. A significant portion of growth in passengers is driven by an increase in demand for international air service. Massport has provided new service to international destinations and expandined service to existing destinations. As passenger levels have increased, aircraft operations remain significantly below the peak of 507,449 operations experienced in 1998 when Logan Airport served 26.5 million passengers.

The long-term trend is towards more efficient operations and reductions or limited increases in overall environmental impacts. Although environmental impacts are significantly lower compared to 1998 when operations were highest, comparison of activity level and environmental impact data to 2014 and more recent EDRs identifies increases in noise exposure and air emissions. These increases were not forecast in the 2011 ESPR. The increases are associated with passenger growth, changes in flight patterns and changes in modeling of noise and air quality. A significant impact since 2011 is the introduction by the Federal Aviation Administration (FAA) of changes to area navigation (RNAV) procedures. The RNAV program has been implemented throughout the country and its primary purpose

is to increase safety and operational efficiency. The implementation of several of these procedures have resulted in concentration of flight patterns over certain communities and significant increases in noise exposure.

The impact of the RNAV program on communities and individuals is clearly reflected in the many comment letters received on the EDR and received during review of specific projects, including the Terminal E Modernization Project (EEA# 15434). In addition, the 2015 EDR indicates that noise complaints have grown significantly. I have received comment letters from elected officials including U.S. Senator Elizabeth Warren, the City of Quincy's Office of Council, and the Milton Office of Selectmen); the Logan Airport Community Advisory Committee; environmental advocacy groups; businesses; and residents. Massport and the FAA recently signed a Memorandum of Understanding (MOU) to frame a process for analyzing opportunities to incrementally reduce noise through changes or amendments to Performance Based Navigation (PBN), including RNAV procedures. I commend Massport and the FAA for establishing this agreement and committing to coordinate to address the impact of the RNAV program on citizens and communities. Massport has indicated that this process will incorporate community outreach and public input. This effort should be a significant focus of the 2016 ESPR. A-4

In addition to noise impacts and abatement, traffic and air quality are common concerns of commenters. Several commenters express continued concern with the effects of ultrafine particulates (less than 100 nanometers in diameter) which are associated with transportation sources, including aviation. Massport has proposed that the Massachusetts Department of Environmental Protection (MassDEP) amend the Logan Airport Parking Freeze Regulation (310 CMR 7.30) so that Massport may increase on-airport parking. Massport has proposed increasing its parking supply, if the regulations are amended, to reduce trip generation associated with increases in passenger drop-off and pick-up at the airport. Commenters are concerned that the lifting of the Parking Freeze will lead to increases in long-term growth in traffic and congestion. I expect the data provided in the 2015 EDR will inform any project-specific review which would include review of potential environmental impacts and of project-specific impact avoidance, minimization, and mitigation measures. A-5 I note that commenters have requested to review data that supports Massport's assertion including data from its parking survey. A-6

The EDR includes a significant amount of information and data which can be analyzed to understand historical conditions and trends as well as compare data on an annual basis or to significant milestones or benchmarks. For instance, the EDR identifies and refers to 1998 because it represents the maximum number of operations, references 2000 because that marks the beginning of a concerted effort to identify and track sustainability indicators to guide programs and mitigation, and references 2008-9 because of the economic recession and its associated effect on activity levels. Equally important to monitoring and historical data, are projections to understand how past or existing trends may affect future conditions. The 2011 ESPR projected year was 2030 and the 2016 ESPR projected year will be 2035. Many of the comments received question the relevance of comparison to certain years, assert that too much emphasis has been placed on historical trends rather than recent increases in certain indicators, and/or question the accuracy of data analysis. Massport has responded to comments regarding data in the past by improving the organization, content and presentation of data and analysis of the ESPR and EDR. The 2014 EDR in particular was a significant improvement and the 2015 EDR continues this trend.

The 2015 EDR identifies additional data collection and identifies changes in modeling programs that are designed to more accurately estimate impacts but may produce different results based on same inputs (i.e. a decrease in emissions could result from a change in modeling rather than an actual reduction in emissions). Also Massport has expanded its reporting on greenhouse gas (GHG) emissions to include tenants and ground access passenger vehicles as well as indirect sources.

The FAA Aviation Environmental Design Tool (AEDT) which was introduced in 2015 is a significant change in modeling of noise and air quality. FAA is requiring airports to use AEDT for National Environmental Policy Act (NEPA) review projects and soundproofing eligibility. The tool models aircraft performance in space and time to produce fuel burn, emissions, and noise information. The EDR indicates that Massport initiated modeling with AEDT but had concerns that it did not accurately reflect the noise environment at Logan Airport. Massport consulted with FAA and determined that the AEDT results would not be published in the 2015 EDR. Massport is evaluating the new model and working with the FAA to develop the types of Logan Airport specific adjustments for the AEDT model that have been used for many years in the Integrated Noise Model (INM). Massport has requested that the FAA consider and approve these adjustments and indicates that, if completed in a timely fashion, AEDT modeling results would be presented in the 2016 ESPR. A-7

Based on significant changes in operations, modeling and data collection, the 2016 EDR provides an opportunity to reconsider data collection, presentation and analysis. I expect Massport will consider the many thoughtful comments provided on these issues and will provide a comprehensive analysis of these significant changes (e.g. RNAV, AEDT) and results and projections may be influenced by them. A-8

General

The 2016 ESPR should follow the general format of the 2011 ESPR, presenting major policy discussions and an overview of the role of Logan Airport in the regional planning context. This should be followed by a status report on Massport's planning initiatives, projects, and mitigation measures. A-9 The ESPR should include an Executive Summary and Introduction, similar to previous ESPRs and EDRs. Massport must provide necessary background information to allow reviewing agencies and the public to understand the environmental policies and planning which form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport. A-10 Some commenters acknowledged Massport's efforts to increase outreach and resources, including providing translation at meetings and translation of the EDR Executive Summary into Spanish. A-11

The 2016 ESPR should report on updated passenger and operations activity forecasts for Logan Airport, Hanscom Field and Worcester Regional Airport. The new forecast used should begin with 2016 as the base year and project activity forecasts forward to calendar year 2035. A-12 In addition, the 2016 ESPR will use the results of the 2016 Logan Airport Air Passenger Ground Access Survey and the Long-term Parking Management Plan to inform transportation planning. A-13

The technical studies in the 2016 ESPR should include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. A-14 The 2016 ESPR must also respond to issues explicitly noted in this Certificate and the comments received on the 2015 EDR. A-15

A distribution list for the 2016 ESPR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. A-16 This section must also include copies of all ESPR and EDR Certificates issued since the 2011 Logan ESPR to provide context for reviewers. A-17 Supporting technical appendices should be provided as necessary. A-18

Responses to Comments

To ensure that the issues raised by commenters are addressed, the 2016 ESPR should include direct responses to comments to the extent that they are within MEPA jurisdiction. This directive is not intended to, and shall not be construed to, enlarge the scope of the 2016 ESPR beyond what has been expressly identified in this Certificate. A-19 I recommend that Massport continue to use the format from the EDR; however, it should limit references to a section of the 2016 ESPR unless they are directly responsive to the comment. A-20 Common themes that should be addressed throughout the ESPR and in the Responses to Comments include noise modeling, contours and abatement. A-21 The 2016 ESPR should include sufficient information to address comments on traffic and air quality. Massport should consult directly with individual commenters as appropriate. A-22

Activity Levels

This section reports on annual air traffic activity at Logan Airport in 2015, including air passengers, aircraft operations, aircraft fleet mix, and cargo volumes. Air traffic activity levels at Logan Airport are the basis for the evaluation of noise, air quality effects, and ground access conditions. In this section, current activity levels at the Airport are compared to prior-year levels, and historical passenger and operations trends at Logan Airport dating back to 2000 which is the year Massport approved an Environmental Management Policy. The total number of air passengers increased by 5.7 percent to 33.4 million in 2015, compared to 31.6 million in 2014. As noted previously, the 2015 passenger level represents a record high for Logan Airport.

Passenger aircraft operations accounted for 91 percent of total aircraft operations in 2015. The total number of aircraft operations increased from 363,797 in 2014 to 372,930 in 2015, a 2.5-percent increase. This was preceded by a 0.7 percent increase from 2013 to 2014. Operations are increasing compared to previous years; however, aircraft operations at remained below the 487,996 operations in 2000 and the historical peak of 507,449 achieved in 1998. In 1998, Logan Airport served 26.5 million air passengers, compared to 33.4 million in 2015, which saw 134,519 fewer operations.

Air carrier efficiency continued to improve in 2015 as the average number of passengers per aircraft operation at Logan Airport grew from 87.0 in 2014 to 89.7 in 2015. While the number of domestic and international passengers is increasing, international passenger demand is projected to increase at a faster rate than domestic passenger demand. Annual domestic passengers' activity levels increased from 26.5 million in 2014 to 27.8 million in 2015, a 4.8-percent increase. Total international passengers at Logan Airport increased from 5.0 million in 2014 to 5.5 million in 2015, a 10.9-percent increase. International passengers made up approximately 16.1 percent of total Airport passengers in 2015, and this is projected to increase steadily to nearly 20 percent of the total by 2030 or sooner. The strong international passenger growth was driven by the economic attractiveness of the metropolitan

Boston region and the strength of Boston as an O&D market. New international destinations from Logan Airport in 2015 included Mexico City, Hong Kong, Tel Aviv, and Shanghai.

The 2016 ESPR should report on airport activity levels and aircraft operations, including: A-23

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
- Domestic and international passenger activity levels;
- Cargo and mail volumes;
- Compare 2016 aircraft operations, cargo/mail operations, and passenger activity levels to 2015 activity levels; and
- Report on national aviation trends in 2016 and compare to trends at Logan Airport.

It should report on forecasting upon which planning and impact sections will be based for the next five years. Future year analyses should be based on the 2035 forecast. It should update the aircraft operations and passenger activity forecasts, and provide a discussion of analysis methodologies and assumptions, including anticipated fleet mix changes and other trends in the aviation industry. It should also provide: A-24

- A comparison of 2016 operations to historic trends and 2035 forecasts;
- Updated forecasts of Logan Airport's passenger volume, aircraft operations, and fleet mix; and
- A comparison of forecast activity levels to Massport forecasts, FAA forecasts and the U.S. aviation industry.

Sustainability at Logan Airport

The 2015 EDR describes Massport's airport wide sustainability goals as identified in its Environmental Management Policy (EMP) and 2015 Sustainability Management Report (SMR). The SMR identifies efforts to promote, coordinate and integrate sustainability Airport-wide. A baseline data assessment was completed in winter 2014 to assess current sustainability performance at the Airport.

The 2015 EDR reports its progress towards achieving each goal. Massport revised its Sustainable Design Standards and Guidelines (SDSG) in March 2011 which provide a framework for sustainable design and construction for both new construction and rehabilitation projects. Since 2000 Massport has been striving to achieve certification by the U.S. Green Building Council Leadership in Energy and Environmental Design (LEED) for new and substantial rehabilitation of building projects over 20,000 square feet (sf). The Rental Car Center in the Southwest Service Area was certified at the LEED Gold level and the Green Bus Depot was certified at the LEED Silver level.

Progress on the EMP should be incorporated into subsequent EDRs and ESPRs. A-25

Climate Change

Massport assets including Logan Airport are critical elements of the State's infrastructure and economy. As recognized in Governor Baker's recent Executive Order 569 "Establishing an Integrated Climate Change Strategy for the Commonwealth" and a suite of other state and municipal initiatives, the impacts of climate change must be an important consideration for development across the state. The EO

indicates that climate change presents a serious threat to the environment and the Commonwealth's residents, communities and economy. It indicates that extreme weather events associated with climate change present a serious threat to public safety and the lives and property of our residences. In addition, it indicates that the transportation sector continues to be a significant contributor to GHG emissions in the Commonwealth and is the only sector in which GHG emissions are increasing.

The 2015 EDR contains a greenhouse gas (GHG) emissions inventory for Logan Airport. Data is presented in units of million metric tons. It indicates that, in 2015, total GHG emissions grew by 6 percent due to aircraft operations and taxi times. Analysis of emissions has been expanded from a focus on direct sources associated with Massport assets and facilities to incorporate emissions associated with tenants and transportation and include indirect emissions for all sources.

Massport has indicated that it will continue to report on GHG emissions in 2016 and will quantify aircraft, ground service equipment (GSE), motor vehicles and stationary sources using emission factors and methodologies outlined in the EEA GHG Policy and the Transportation Research Board's *Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories* (Airport Cooperative Research Program (ACRP) Report 11, Project 02-06) and other relevant guidance. The expansion of GHG reporting is significant and will guide Massport efforts to achieve sustainability goals and GHG emission reduction goals. A-26 The presentation of the data could be improved, for instance, by normalizing data and/or reporting emissions in several units (e.g. MMT and tpy) to allow comparisons between various programs, policies and reporting requirements. Massport controlled emissions and tenant emissions, for instance, could be reported in kBtu/sf-yr by building for benchmarking purposes. A-27 Identification of total GHG emissions associated with buildings and fuel sources would be informative. I encourage Massport to consider make this a focus for the 2016 ESPR. A-28 In addition, I encourage Massport to consider establishment of aggressive goals for reducing GHG emissions, and in particular transportation emissions, in the 2016 ESPR. A-29 The ESPR should describe analysis methodologies and assumptions to develop the 2016 ESPR emissions inventory and provide forecasts for 2035. The results should be compared to 2015. A-30

In recognition of the potential effects of climate change on Massport infrastructure and operations, the Disaster and Infrastructure Resiliency Planning (DIRP) Study was initiated. A particular concern for Massport is the effect of sea level rise and projected increases in the severity and frequency of storms. The Study includes Logan Airport, the Port of Boston, and Massport's waterfront assets in South and East Boston. The DIRP Study includes a hazard analysis; modeling of projected sea-level rise and storm surge; and, temperature and precipitation projections and anticipated increases in extreme weather events. The study is nearing completion. I note that information from the Study has been incorporated into project-specific reviews. The 2016 ESPR should provide a summary of the DIRP Study and identify which recommendations Massport will implement in the short term to increase the resiliency of its facilities to the potential effects of climate change. A-31

Mitigation

The 2015 EDR identifies the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review. The 2016 ESPR and future EDRs will continue to be the forum to address cumulative, Airport-wide impacts. A-32 The 2016 ESPR should update A-33

the status of Massport's mitigation commitments for the Terminal E Modernization Project and report on projects previously included in the EDRs. A-33 Cont.

Planning

The Airport Planning section describes the status of projects underway or completed at Logan Airport by the end of 2015 and provides updates for projects in progress. Specific topics include terminal area projects, service area projects, buffer/open space projects, Airport parking projects, airside area projects, high occupancy vehicle (HOV) improvements, and Airport-wide projects. It also describes known future planning, construction, and permitting activities.

It includes the following Airport Projects:

- *Terminal E Renovation and Enhancements Project*: This project includes interior and exterior improvements at Terminal E to accommodate regular service by wider and longer Group VI aircraft. The project does not include any new gates, but will reconfigure three existing gates to accommodate Group VI aircraft (including the Airbus A380 and Boeing 747-8 primarily used by international air carriers). An addition to the west side of Terminal E will allow passenger holdrooms to be reconfigured to accommodate the larger passenger loads associated with larger aircraft. The project also includes modifications to the airfield to meet required FAA safety and design standards to accommodate the larger aircraft. Construction commenced in 2015.

- *Terminal E Modernization Project*: This is proposed to accommodate existing and long range forecasted demand for international service. The expansion will add the three contact gates approved in 1996 as part of the International Gateway West Concourse project (EEA #9791), which were never constructed, and an additional two to four additional new gates in an extended concourse. A key feature of this project is the first direct pedestrian connection from the MBTA Blue Line Airport Station to the terminal complex at Logan Airport. It will also include improvements to Airport roadways to facilitate access. The project underwent MEPA review in 2016. Massport intends to commence construction prior to 2018.

- *Terminal C to E Connector:* The Terminal C to E Connector provides a new post-security connection between Terminals C and E on the Departures Level. Approximately 18,900 sf were made to the existing building, and 3,500 sf of new exterior construction. The connector provides improved passenger circulation within the post-security concourses, additional holdroom space at Terminal E, reconfigured office space, concessions and concessions support, and a new consolidated location for escalators and stairs. The project was completed in May 2016.

  Terminal B Airline Optimization Project: Massport is upgrading its facilities on the Pier B side of Terminal B to meet airlines' needs (primarily reflecting the merger of American Airlines and US Airways) and to provide facilities that improve the passenger traveling experience. Similar improvements have been implemented with the recent renovations and improvements at Terminal B, Pier A. Planned improvements include an enlarged ticketing hall, improved outbound bag area, expanded bag claim hall, expanded concession areas, and expanded holdroom capacity at the gate.

The 2016 ESPR should continue to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport must accommodate and guide tenant development. The ESPR should describe the status of planning initiatives for the following areas:

- Roadways and Airport Parking;
- Terminal Area;
- Airside Area;
- Service and Cargo Areas; and
- Airport Buffers and Landscaping.

A-34

The 2016 ESPR should also indicate the status of long-range planning activities, including the status of public works projects implemented by other agencies within the boundaries of Logan Airport. A-35

The ESPR should also indicate the status and effectiveness of ground access changes, including roadway and parking projects, that consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on streets in adjacent neighborhoods. A-36

Regional Transportation

The 2015 EDR describes activity levels at New England's regional airports in 2015 and provides an update on regional planning activities, including long-range transportation efforts. The New England region is anchored by Logan Airport and a system of 10 other commercial service, reliever, and general aviation (GA) airports (regional airports). Overall, passenger traffic at the New England airports in 2015 represented the highest passenger traffic level for the region since the economic downturn in 2008 and exceeding the historical peak of 48.0 million in 2005. The increase in the region's passenger traffic was largely driven by continued growth at Logan Airport. In 2015, the total number of air passengers utilizing New England's commercial service airports, including Logan Airport, increased by 4.1 percent from 46.8 million annual air passengers in 2014 to 48.7 million in 2015. Of the 48.7 million passengers using New England's commercial service airports in 2015, 68.6 percent of passengers (33.4 million) used Logan Airport compared to 67.6 percent (31.6 million) in 2014. While passenger activity levels have increased, aircraft operations in the New England region remained flat in 2015, increasing 0.3 percent from 987,652 operations in 2014 to 991,041 operations in 2015. The 2016 ESPR should report on the issues identified below.

Regional Airports

- 2016 regional airport operations, passenger activity levels, and schedule data within an historical context;
- Status of plans and new improvements as provided by the regional airport authorities;
- Role of the Worcester Regional Airport and Hanscom Field in the regional aviation system and Massport's efforts to promote these airports; and
- Ground access improvements at Massachusetts Regional Airport.

A-37

Regional Transportation System

- Massport's role in managing the regional transportation facilities within MassDOT;
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and

A-38

- Report on metropolitan and regional rail initiatives and ridership. A-38 Cont.

Ground Access to and from Logan Airport

The 2015 EDR reports on transit ridership, roadways, traffic volumes, and parking for 2015. Massport continues to be in full compliance with the Logan Airport Parking Freeze regulations (310 Code of Massachusetts Regulations 7.30) which regulates the number of commercial and employee parking spaces allowed at Logan Airport (total limit of 21,088). The Parking Freeze is included in the Massachusetts State Implementation Plan (SIP) to achieve compliance with the Clean Air Act (42 U.S.C. §7401 et seq. [1970]). Massport submits semi-annual compliance filings to MassDEP; March and September reports are provided in the 2015 EDR. As permitted (and encouraged) by the Parking Freeze provisions, Massport has converted employee spaces to commercial spaces, within the overall limits.

The EDR states that Massport has continued to invest in and operate Logan Airport with a goal of increasing the number of passengers arriving by transit or other high occupancy vehicle (HOV) modes. The HOV/transit mode share at Logan Airport continues to rank at the top of U.S. airports. The 2015 EDR identifies improvements to increase HOV/transit mode share including introduction of the Back Bay Logan Express pilot service (since May 2014); free boardings from Logan Airport to the MBTA Silver Line outbound; construction of a 1,100-car parking garage at the Framingham Logan Express; reduced holiday travel parking rates at Logan Express facilities; increased parking rates on the Airport; and support for private coach bus and van operators.

As part of its Long-Term Parking Management Plan, Massport is considering a series of measures to minimize pick-up/drop-off activity. The EDR indicates that the increase in terminal area parking rates since July 1, 2014 described in the 2014 EDR, does not seem to be have influenced parking demand; daily parking demand more frequently approached the Parking Freeze cap in 2015. The 2015 EDR identifies a proposal to build up to 5,000 new on-Airport commercial parking spaces. Massport states that the goal of the project is to reduce the number of drop-off/pick-up mode which generate more traffic than parking. The construction of additional commercial parking spaces is dependent upon amending the Parking Freeze legislation. Massport has initiated a stakeholder process prior to proposing any amendments and Massport anticipates initiating a parallel review process.

The Airport-wide Automated Traffic Monitoring System (ATMS) consists of permanent traffic count stations at the Airport's gateway roadways, including the Route 1A roadway ramps, the Interstate-90 (I-90) Ted Williams Tunnel ramps, and Frankfort Street/Neptune Road. These stations provide data on annual average daily traffic (AADT), annual average weekday daily traffic (AWDT), and annual average weekend daily traffic (AWEDT). The AADT increased by 0.1 percent between 2014 and 2015. The change in average daily traffic can be attributed to: a 5.7-percent increase in air passenger activity in 2015; a 3.0-percent increase in taxi dispatches in 2015; and 1.1-percent decrease in parking activity (exits) in 2015. Historically, the highest AADT recorded at Logan Airport was in 2007, when AADT reached 110,690, AWDT was 119,200, and AWEDT was 91,320 that same year. These gateway traffic volumes corresponded to an annual air passenger level of 28,102,455 passengers.

On-Airport vehicle miles of travel (VMT) is calculated based on the total number of miles traveled by all vehicles within the Logan Airport roadway system and is used to calculate motor vehicle air emissions. Massport upgraded its modeling capabilities in 2011 and began using an on-Airport VISSIM-10 model which is more robust than the previous model. The adjustment factors for the 2015

VMT calculations were determined by using 2011 to 2015 gateway, Airport roadway, and parking volume averages.

Based on the traffic data obtained from Massport's ATMS, the change in on-Airport daily traffic volumes between 2014 and 2015 was negligible. However, 2015 evening peak hour gateway volumes grew by roughly 5 percent when compared to 2014. Additionally, a shift in gateway traffic entering/exiting the Airport from the Ted Williams Tunnel to the Sumner/Callahan Tunnels was noted. Daily traffic volumes in the Ted Williams Tunnel decreased by 8.4 percent (from 49,600 to 45,400 vehicles) while volumes in the Sumner/Callahan Tunnels increased by 19.5 percent (from 29,800 to 35,600 vehicles). Since 2000, the highest average weekday VMT estimated at Logan Airport was in 2007, when weekday VMT was modeled at 184,613. Although VMT was estimated at lower levels in 2015, a direct comparison between values cannot be made because of significant changes in the study area.

The 2016 ESPR should report on 2016 ground access conditions at the airport and provide a comparison of 2016 findings to those of 2015 for the following: A-39

- Detailed description of compliance with Logan Airport Parking Freeze;
- HOV ridership (including Blue Line, Silver Line, Water Transportation, and Logan Express);
- Logan Airport Employee Transportation Management Association (Logan TMA) services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport VMT;
- Parking demand and management (including rates and duration statistics);
- Status of long-range ground access management strategy planning;
- Results of the 2016 Logan Airport Air Passenger Survey; and,
- Status of proposed connector to the Airport Station associated with the planned Terminal E Modernization Project.

The chapter should present a discussion of analytical methodologies and assumptions for the planning horizon year (2035) for traffic volumes, on-airport VMT and parking demand. A-40

The 2016 ESPR should address the following topics: A-41

- Massport's target HOV mode share along with incentives;
- Non-Airport through-traffic;
- Massport's cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line, Silver Line, Water Transportation, and Logan Express;
- Efforts to increase capacity and usage of Logan Express;
- Progress on enhancing water transportation to and from Logan Airport;
- Report on results of ground access study; and
- Strategies for enhancing services and increasing employee membership in the TMA.

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Noise

The 2015 EDR updates the status of the noise environment at Logan Airport in 2015, and describes Massport's efforts to mitigate noise exposure and impacts. As noted previously, the implementation of RNAV has resulted in concentration of flight patterns over certain communities and significant increases in noise exposure. Noise complaints have increased from 12,855 calls in 2014 to 17,685 calls in 2015. In addition, the FAA introduced the AEDT, a new model for noise and air quality. Massport did not submit AEDT modeling results and, instead, modeled noise using the FAA's Integrated Noise Model (INM) as in previous years. Massport intends to use the AEDT for noise modeling for the 2016 ESPR if the adjustments are approved by the FAA. Massport should update the MEPA office regarding the status of the requested adjustments and consult with the MEPA office regarding ESPR noise modeling as early as possible if the FAA does not approve use of the requested adjustments or it appears that the FAA review will be delayed. I note comments that indicate data should be provided regardless of FAA's approval or timing. A-42 Otherwise, noise contours for 2016 should be developed using AEDT and compared to the most recent version of the Integrated Noise Model (INM) which has been in place for all previous EDRs and ESPRs. Logan Airport-specific model adjustments made to account for over-water sound propagation and the propagation of sound to areas of higher terrain may be reported as an add-on to AEDT, if accepted by the FAA. A-43

Compared to 2000, the 2015 EDR indicates that total operations were down by 23.6 percent while total passengers were up by 20.6 percent; that the percentage of jet operations increased to 86 percent from 66 percent; and the number of people exposed to Day-Night Average Sound Level (DNL) 65 decibels (dB) has declined by 20.6 percent.

Compared to 2014, the 2015 DNL 65 dB noise contours were larger in most areas around the Airport due to changes in: (1) runway usage, primarily as a result of wind and weather conditions, (2) a 5.7% increase in the number of nighttime operations, and (3) an increase in the number of overall operations. The overall number of people exposed to DNL values greater than or equal to 65 dB increased by 58.0 percent, from 8,922 people in 2014 to 14,097 people in 2015. This increase is a significant concern to residents, as clearly indicated in comment letters, and to Massport.

Runway use changes from 2014 to 2015 were the largest factor in the increase in the number of people exposed to DNL values greater than or equal to 65 dB in 2015 which is a significant issues raised in many comments. The DNL contour increased in East Boston and slightly in South Boston due to an increase in Runway 22R departures. The DNL contour in Winthrop increased because departures from Runway 22L increased. Increased nighttime arrivals to Runways 22L and 27 contributed to increases in Revere and Winthrop. Data from 2015 reflects almost a full year of the head-to-head night noise abatement procedures on Runway 15R-33L. While this reduces overall noise exposure by concentrating operations over water rather than over populated areas, it increases start-of-takeoff-roll noise in East Boston, north and west of the Runway 15R end. Decreased use of Runway 4R for arrivals in 2015 resulted in a reduction in the contour south of the Airport.

Nighttime operations increased from 48,056 to 50,786 in 2015. The increase remains below the peak of 54,038 annual operations at night reached in 1999; however, this growth is significant and a particular concern given the extent and concentration of noise exposure. As airlines have expanded to

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new destinations, the number of commercial operations, and in turn the number of nighttime operations, has increased. In 2015, there was an increase of 7.5 nighttime operations per day compared to 2014.

The overall increase in operations was smaller than the increase in nighttime operations (2.5 percent overall versus 5.7 percent nighttime), but contributed to the expansion of the noise contours. The DNL and population levels in 2015 remain well below the peak levels reached in 1990 and are less than in the year 2000 when 17,745 people were exposed to DNL levels greater than or equal to DNL 65 dB. The 2015 DNL 65 dB contour is somewhat larger than the 2014 DNL 65 dB contour. Almost all of the residences exposed to levels greater than or equal to DNL 65 dB in 2015 have been eligible in the past to participate in Massport's residential sound insulation program (RSIP). To date, Massport has provided sound insulation for a total of 11,515 residential units, and will continue to seek funding for sound insulation for properties that are eligible and whose owners have chosen to participate.

The 2016 ESPR should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2016 conditions and compare those conditions to those of 2015 for the following:

- Fleet Mix, including Stage II, Recertified Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft; A-44
- Nighttime operations;
- Runway utilization (report on aircraft and airline adherence with runway utilization goals); and
- Flight tracks.

The 2016 ESPR should report on the following:

- Changes in annual noise contours and noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the models deployed; A-45
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels; and
- Flight track monitoring noise reports.

The 2016 EDR should also report on consultation between Massport and FAA regarding the impacts of RNAV, noise abatement efforts, results of Boston Logan Airport Noise Study (BLANS) study, and provide an update on the noise and operations monitoring system. A-46

Air Quality/Emissions Reduction

The 2015 EDR provides an overview of airport-related air quality issues in 2015 and efforts to reduce emissions. The air quality modeling reported in 2015 EDR is based on aircraft operations, fleet mix characteristics, airfield taxiing times, GSE usage, motor vehicle traffic volumes, and stationary source utilization rates. Total air quality emissions from all sources associated with Logan Airport in 2015 are significantly less than they were a decade ago.

In 2015, calculated emissions of volatile organic compounds (VOCs), oxides of nitrogen (NOx), carbon monoxide (CO), and particulate matter (PM) went up slightly compared to 2014. The increase is

primarily due to the increase in aircraft landing and take offs (LTOs) and airfield taxi times. Total emissions of VOCs increased by 1 percent in 2015 to 1,188 kilograms (kg)/day compared to 1,177 kg/day in 2014. Total NOx emissions increased by approximately 5 percent in 2015, to 4,262 kg/day compared to 2014 levels of 4,040 kg/day. Massport's voluntary Air Quality Initiative (AQI) has tracked NOx emissions since the benchmark year of 1999. In the final year of this program (2015), total NOx emissions were 632 tons per year (tpy) lower than the 1999 benchmark. This represents an overall decrease of 27 percent in NOx emissions over the past 15 years. Between 1999 and 2015, the greatest reductions of NOx emissions were associated with aircraft, GSE, and on-Airport motor vehicles at 17 percent, 71 percent, and 87 percent reductions, respectively. Total CO emissions increased by about 3.5 percent in 2015 to 7,243 kg/day, from 6,987 kg/day in 2014; emissions in 2015 were still well below 1990 and 2000 levels. Total PM10/PM2.5 emissions also increased by about 3 percent in 2015 to 98 kg/day, from 95 kg/day in 2014.

The ESPR should contain an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, changes in air quality modeling and air quality studies. A-47 The ESPR should also provide discussion on progress on the national and international levels to decrease air emissions, including alternative fuel vehicle programs implemented by Massport and/or its tenants. A-48 If the AEDT tool is used for modeling the 2016 ESPR should compare results to the most recent version of the Emissions Dispersion Modeling System (EDMS) that has been used in recent EDR filings. A-49 The Environmental Protection Agency (EPA) MOVES2014a program will continue to be used to estimate vehicular emission on airport roadways. The ESPR should include an emissions inventory for CO, NOx, VOCs, and PMs. A-50

Commenters express concern that the EDR does not provide a substantive response to concerns expressed regarding ultrafine particulates (UFP). As commenters are aware, UFPs are not regulated by the US Environmental Protection Agency (EPA) and EPA has not proposed to adopt standards for UFPs. I encourage Massport to consider how the ESPR might constructively address the concern presented by commenters. The ESPR should specifically identify any ongoing or new policies or programs that would reduce diesel emissions. A-51

The ESPR should include an update on its efforts to encourage the use of single engine taxiing under safe conditions and, A-52 as required in the review of the Terminal E Expansion, Massport should report on progress made in designing the energy systems for the facility and the feasibility of combined heat and power (CHP). A-53

Water Quality/Environmental Compliance

The 2015 EDR describes Massport's ongoing environmental management activities including National Pollutant Discharge Elimination System (NPDES) compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan (MCP), and tank management. Massport's primary water quality goal is to prevent or minimize pollutant discharges, thus limiting adverse water quality impacts of airport activities. Massport employs several programs to promote awareness of activities that may impact surface and groundwater quality. Programs include implementing best management practices (BMPs) for pollution prevention by Massport, its tenants, and its construction contractors; training of staff and tenants; and a comprehensive stormwater pollution prevention plan. The EDR reports that Massport continues to comply with water quality and other environmental regulations.

The 2016 ESPR should identify any planned stormwater management improvements and report on the status of:

- NPDES Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility;
- Jet fuel usage and spills;
- MCP activities;
- Tank management;
- Environmental management plan; and
- Fuel spill prevention.

A-54

Conclusion

I have determined that the 2015 EDR for Logan Airport has adequately complied with MEPA. The EDR provides a comprehensive overview of environmental planning, issues and data. Massport may prepare the 2016 ESPR for submission in 2017 consistent with the Scope included in this Certificate.

February 17, 2017
Date

Matthew A. Beaton

Comments received:

01/18/2017	Logan CAC
01/20/2017	Nancy Timmerman
01/20/2017	Stephen Kaiser
01/20/2017	Boston Harbor Now
01/31/2017	Brian Palmucci, Quincy City Council
01/31/2017	Aaron Toffler, Airport Impact Relief, Inc.
01/31/2017	Chris Marchi
01/31/2017	Wig Zamore
02/01/2017	Bill Schmidt
02/01/2017	Cindy L. Christiansen
02/01/2017	James Roberts
02/01/2017	James Linthwaite
02/01/2017	Town of Milton Office of Selectmen
02/02/2017	John Antonellis
02/17/2017	U.S. Senator Elizabeth Warren

MAB/ACC/acc

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November 13, 2015

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
2014 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME	: 2014 Environmental Data Report
PROJECT MUNICIPALITY	: Boston/Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: October 7, 2015

As Secretary of Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (MEPA) (M.G.L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00).

Background

The environmental review process for Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become, consistent with the objectives of the MEPA regulations, part of the Massachusetts Port Authority's (Massport) long-range planning process. The ESPR provides a "big picture" analysis of the environmental impacts of current and anticipated levels of activities, and presents an overall strategy to minimize impacts. The ESPR is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments for project-specific Environmental Impact

EEA# 3247 EDR Certificate November 13, 2015

Reports (EIR). The ESPR is generally updated on a five-year basis; the most recent ESPR for the year 2011 was filed in April of 2013. Environmental Data Reports (EDRs) (formerly referred to as Annual Updates) are filed in the years between ESPRs.

The EDRs are prepared annually to evaluate environmental conditions for the reporting year compared to the previous year. In the last several years, aircraft operations and passenger activity levels and associated environmental effects have remained well below levels previously analyzed for Logan Airport. Thus, the forecasted aviation growth presented in the 2004 ESPR, the predicate upon which the ESPR schedule was initially established, has not occurred. Accordingly, with the approval of the Secretary of Energy and Environmental Affairs, Massport prepared 2009 and 2010 EDRs in lieu of the ESPR originally planned for 2009. The 2011 ESPR, filed in early 2013, reported on calendar year 2011 passenger activity levels and aircraft operations forecasts. The 2012/2013 EDR presented conditions for both calendar years 2012 and 2013.

The 2014 EDR is the subject of this review. Additionally, this Certificate contains a Scope for the 2015 EDR. This 2014 EDR provides a comprehensive, cumulative analysis of the effects of all Logan Airport activities based on actual passenger activity and aircraft operational levels in 2014 and presents environmental management plans for addressing areas of environmental concern. It also reports on the status of project mitigation. The next anticipated ESPR will report on updated passenger activity levels, aircraft operations forecasts, and environmental conditions forecasts for 2016.

Passenger levels at Logan Airport reached a new peak in 2013, exceeding the 2007 historic peak, while aircraft operations at Logan Airport remained well below the historic peak reached in 1998. The 2014 EDR examines the effects of airlines operating much more efficiently with quieter fleets and flying more passengers per aircraft. As discussed in the 2011 ESPR, the 2014 EDR anticipates further increases in activity levels and some increases in environmental impacts compared to recent years; however, these will remain below levels projected in 2004.

Scope for the 2015 EDR

General

The 2015 EDR should follow the general format of the 2014 EDR. The 2015 EDR should include an Executive Summary and Introduction. To provide context for reviewing agencies and the public, it should provide background information on the environmental policies and planning that shape the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport. A-1

The 2015 EDR should provide an update on conditions at Logan Airport for calendar year 2014, including passenger and aircraft operation activity levels. It should continue to serve as a background/context against which projects at Logan Airport can be evaluated. It should also report on the cumulative effects of Logan Airport operations and activities, compared to previous A-2

2

years, as appropriate. It should provide a status report on Massport's proposed planning initiatives, projects, and mitigation measures. A-2 Cont.

The technical studies in the 2015 EDR should include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. The 2015 EDR must also respond to those issues explicitly noted in this Certificate and the comments received on the 2014 EDR. A-3

A distribution list for the 2015 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2011 Logan ESPR to provide context for reviewers. Supporting technical appendices should be provided as necessary. A-4

Responses to Comments

The 2015 EDR Responses to Comments should address all of the substantive comments from the letters listed at the end of this Certificate. The Responses to Comments included in the 2014 EDR is well-constructed and cross-referenced. I encourage Massport to use the same format in the 2015 EDR. A-5

The majority of comments received on the 2014 EDR focus on noise issues, including measurement of noise, modeling of noise contours, and noise abatement, and emissions reduction issues. In addition to responding to these comments, the 2015 EDR should continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commenters where appropriate. A-6

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This chapter presents aviation activity statistics for Logan Airport in 2014. Logan Airport is New England's primary domestic and international airport, operating as an origin-destination airport, rather than a connecting hub for major airlines. The total number of air passengers increased by 4.7 percent to 31.6 million in 2014, compared to 30.2 million in 2013. The 2014 passenger level represents a new record high for Logan Airport.

Passenger-aircraft operations accounted for 91 percent of total aircraft operations. The total number of aircraft operations increased slightly from approximately 361,339 in 2013 to 363,797 in 2014, a 0.7 percent increase. This was preceded by a 2.4 percent increase in 2013. Despite the increase, aircraft operations at Logan Airport remained well below the 487,996 operations in 2000 and the historic peak achieved in 1998. In 1986, Logan Airport served 21.7 million air passengers, as compared to 31.6 million in 2014 with roughly the same number of total operations (363,995).

Aircraft efficiency continued to improve in 2014 as the average number of passengers per aircraft operation grew from 83.6 in 2013 to 87.0 in 2014. This positive trend is indicative of the industry-wide shift toward higher aircraft load factors and an increase in the number of domestic and international destinations. While the number of domestic and international passengers is increasing, international passenger demand is projected to increase at a faster rate than domestic passenger demand. Total international annual passenger numbers increased from 4.4 million in 2013 to 4.9 million in 2014, a 9.8-percent increase. The strong international passenger growth was driven by several new nonstop services introduced by a number of foreign airlines including Emirates, Turkish Airlines, Hainan Airlines, and Cathay Pacific. Recently launched international destinations include Mexico City, Tokyo, Beijing, Dubai, Istanbul, Panama City, Hong Kong, and Shanghai. International air passengers are anticipated to reach 6 million by 2022 and 8 million by 2030.

The 2015 EDR should report on airport activity levels and aircraft operations, including:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
- Passenger activity levels;
- Cargo and mail activities;
- Compare 2014 aircraft operations, cargo/mail operations, and passenger activity levels to 2013 activity levels; and
- Report on national aviation trends in 2014 and compare to trends at Logan Airport.

A-7

It should also report on Massport's activity level forecasts that will become the basis for the planning and impact sections that follow and for Massport's strategic planning initiatives for the future ESPR. Massport should address comments related to activity levels in the 2015 EDR. A-8

Sustainability at Logan Airport

The 2014 EDR describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles. In 2013, Massport was awarded a grant by the Federal Aviation Administration (FAA) to prepare a Sustainability Management Plan (SMP) for Logan Airport. The purpose of the SMP is to enhance the efficiency and sustainability of Logan Airport's operations and to support the broader sustainability principles of the Commonweath. The Logan Airport SMP planning effort began in May 2013 and was completed in April 2015. The plan is intended to promote and integrate sustainability Airport-wide and to coordinate ongoing sustainability efforts at Massport. A baseline data assessment was completed in winter 2014 to assess current sustainability performance at the Airport. The Logan Airport SMP developed a framework and implementation plan, with metrics and targets, designed to track progress over time.

The 2014 EDR provides an excellent overview of Massport's commitment to incorporate sustainability into all aspects of Massport's activities: Planning and Design; Construction; Operations, Maintenance and Management; and Monitoring of Environmental Performance. It also identifies specific practices to reduce impacts of construction and efforts to address energy intensity, percentage of renewable energy, and GHG reductions. The SMP establishes goals for

ten categories: Energy and Greenhouse Gases; Water Conservation; Community, Employee, and Passenger Well-being; Materials, Waste Management, and Recycling; Resiliency; Noise Abatement; Air Quality Improvement; Ground Access and Connectivity; Water Quality/Stormwater; and Natural Resources.

A specific example includes compliance with the Leading by Example Executive Order which requires state agencies to procure 15 percent of their electricity from renewable resources by 2012. The Leading by Example program has influenced Massport's own operations including its offices, heating plants, and garages resulting in Massport receiving the Leading by Example award in 2008. Massport is striving to achieve LEED certification for new and substantial rehabilitation of building projects over 20,000 square feet. Some recent examples of LEED certified buildings at Logan Airport. The new Rental Car Center in the Southwest Service Area (SWSA) began construction in 2010 and was completed in 2013and was awarded Logan Airport's first LEED Gold Certification in 2015.

I commend Massport for its commitment to sustainability and its leadership. Progress on the SMP should be incorporated into subsequent EDRs and ESPRs. The 2015 EDR should report on the progress towards each of the ten goals and sustainability-related performance. A-9

The 2015 EDR should report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review, including whether they are under construction or completed. The status of mitigation commitments made in the Section 61 Findings for the following projects should be included: A-10

- West Garage/Central Garage (EEA #9790)
- International Gateway (EEA #9791)
- Logan Airside Improvements Planning Project (EEA #10458)
- Terminal A Replacement Project (EEA #12096)
- Southwest Service Area Redevelopment Program/Rental Car Center (EEA #14137)
- Logan Runway Safety Area Improvements Project (EEA #14442)

Planning

The Airport Planning chapter in the 2014 EDR provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2014. It also describes future planning, construction, and permitting activities and initiatives. It includes the following Airport Projects:

- *Parking Consolidation Project*: Massport is consolidating 2,050 temporary parking spaces as an addition to the West Garage and at the existing surface lot between the Logan Office Center and the Harborside Hyatt. These spaces constitute all the remaining spaces permitted under the Logan Airport Parking Freeze. The West Garage addition is atop the existing Hilton Hotel parking lot. The project will incorporate sustainable design and resiliency elements. The consolidation is expected to be completed in 2015.
- *Terminal E Renovation and Enhancements Project*: This project includes interior and exterior improvements at Terminal E to accommodate regular service by wider and

longer Group VI aircraft. The project does not include any new gates, but will reconfigure three existing gates to accommodate Group VI aircraft (including the Airbus A380 and Boeing 747-8 primarily used by international air carriers). An addition to the west side of Terminal E will allow passenger holdrooms to be reconfigured to accommodate the larger passenger loads associated with larger aircraft. The project also includes modifications to the airfield to meet required Federal Aviation Administration (FAA) safety and design standards to accommodate the larger aircraft. An Environmental Assessment (EA) was filed and FAA issued a Finding of No Significant Impact (FONSI) on July 29, 2015. Construction commenced in 2015.
- *Terminal E Modernization Project*: To accommodate existing and long range forecasted demand for international service in an efficient, environmentally-sound manner that also improves customer service, Massport is planning to expand Terminal E. Modernizing Terminal E would add the three contact gates approved in 1996 as part of the International Gateway West Concourse project (EEA #9791), which were never constructed, and an additional two to four additional new gates in an extended concourse. A key feature of this project is the first direct pedestrian connection from the MBTA Blue Line Airport Station to the terminal complex at Logan Airport. This project would also include improvements to Airport roadways to facilitate access. The project is in the conceptual design phase. Massport intends to commence construction prior to 2018. An Environmental Notification Form (ENF) for this project (EEA#15434) was published in the November 9 Environmental Monitor.
- *Logan Airport Greenway Connector Project:* The Logan Airport Greenway Connector ("Greenway Connector") is a pedestrian/bicycle path connecting the Bremen Street Park path to the future City of Boston Narrow Gauge Connector, a pedestrian/bicycle path that begins at the Greenway Overlook and continues to Constitution Beach. Construction of the Greenway Connector began in spring 2013 and was completed in July 2014.
- *The Rental Car Center (RCC)*: Consolidating the rental car shuttle bus fleet and some Massport shuttle buses into a unified shuttle route system resulted in the elimination of eight rental car bus fleets (a net total of 66 buses have been eliminated). It included intersection and roadway infrastructure improvements including signal coordination and dedicated ramp connections. It also created a Ground Transportation Operations Center (GTOC) to support efficient planning and operation of Airport-wide transit activities.

In recognition of the potential and significant effects of climate change on Massport infrastructure and operations, Massport has initiated the Disaster and Infrastructure Resiliency Planning (DIRP) Study. A particular concern for Massport is the effects of sea level rise and projected increases in the severity and frequency of storms. The Study includes Logan Airport, the Port of Boston, and Massport's waterfront assets in South and East Boston. The DIRP Study includes a hazard analysis; modeling of projected sea-level rise and storm surge; and, temperature and precipitation projections and anticipated increases in extreme weather events. The study is nearing completion. The 2015 EDR should provide a summary of the DIRP Study and identify which recommendations Massport will implement in the short term to increase the resiliency of its facilities to the potential effects of climate change. A-11

Massport is developing a long-term parking management plan for Logan Airport. The Long-Term Parking Management Plan will lay out a multi-part strategy for efficiently managing parking supply, pricing, and operations – both at Logan Airport and at off-Airport locations controlled by Massport – to maximize access for transit and shared-ride vehicles while minimizing both drive-and-park and pick-up/drop-off modes. The 2015 EDR should provide updates on this plan. A-12

The 2015 EDR should also report on Massport planning to improve Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport also must accommodate and guide tenant development. Specifically, the 2015 EDR should also describe the status of planning initiatives for the following areas: A-13

- Roadway Corridor Project;
- Airport Parking;
- Terminal Area;
- Airside Area;
- Service and Cargo Areas; and
- Airport Buffers and Landscaping.

The 2015 EDR should provide a status report on long-range planning activities. This chapter should include the status and effectiveness of the ground access changes, including roadway and parking projects, that will consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on external streets in adjacent neighborhoods. A-14

Regional Transportation

The 2014 EDR describes activity levels at New England's regional airports in 2014 and provides an update on regional planning activities, including long-range transportation efforts. The New England region is anchored by Logan Airport and a system of 10 other commercial service, reliever, and general aviation (GA) airports (regional airports). Overall, passenger traffic at the New England airports in 2014 represented the highest passenger traffic level for the region since the economic downturn in 2008. The increase in the region's passenger traffic was largely driven by continued growth at Logan Airport. In 2014, the total number of air passengers utilizing New England's commercial service airports, including Logan Airport, increased by 3.1 percent from 45.4 million in 2013 to 46.8 million annual air passengers in 2014. Of the 46.8 million passengers using New England's commercial service airports in 2014, 67.6 percent of passengers (31.6 million) used Logan Airport compared to 66.6 percent (30.2 million) in 2013. While passenger activity levels have increased, aircraft operations in the New England region have decreased. In 2014, regional aircraft operations decreased by 4.3 percent, from 1.02 million operations in 2013 to 0.97 million operations in 2014.

The 2015 EDR should describe Logan Airport's role in the region's intermodal transportation system by reporting on the following: A-15

Regional Airports

- 2015 regional airport operations, passenger activity levels, and schedule data within an historical context;
- Status of plans and new improvements as provided by the regional airport authorities;
- Ground access improvements; and
- Role of the Worcester Regional Airport and Hanscom Field in the regional aviation system and Massport's efforts to promote these airports.

Regional Transportation System

- Massport's role in managing the regional transportation facilities within MassDOT;
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
- Report on metropolitan and regional rail initiatives and ridership.

Ground Access to and from Logan Airport

The 2014 EDR reports on transit ridership, roadways, traffic volumes, and parking for both 2012 and 2013. Specifically, the EDR states that Massport has continued to invest in and operate Logan Airport with a goal of increasing the number of passengers arriving by transit or other high occupancy vehicle (HOV) modes. The HOV/transit mode share at Logan Airport continues to rank at the top of U.S. airports. However, private passenger vehicle trips continue to increase with growth in air travel. As Logan Airport air traveler numbers have increased, a constrained parking supply at Logan Airport has resulted in an increase in pick-up and drop-off vehicle trips. These trips generate automobile emissions both locally and regionally. As part of its Long-Term Parking Management Plan, Massport is considering a series of measures to minimize pick-up/drop-off activity.

In 2014, Massport remained in full compliance with the Logan Airport Parking Freeze regulations. Despite an increase in terminal area parking rates on July 1, 2014, daily parking demand more frequently approached the Parking Freeze cap in 2014. Massport is consolidating 2,050 temporary parking spaces in addition to the West Garage and at the existing surface lot between the Logan Office Center and the Harborside Hyatt. These spaces constitute all remaining spaces permitted under the Logan Airport Parking Freeze. Increases in weekday peak commercial parking demand places additional pressure on roadway and parking operations under the Logan Airport Parking Freeze. In 2014, due to high demand on Tuesdays, Wednesdays, and Thursdays, 30,314 cars were diverted to another garage or lot and 56,634 cars were valeted/stacked (when cars are parked in aisles, have their keys taken, and then are re-parked in empty spaces as they become vacant); this represents over a 50 percent increase since 2013. There were about 40 weeks in which one or more of these measures were put into effect in 2014.

The 2015 EDR should report on the following and compare trends to 2014:

- Detailed description of compliance with Logan Airport Parking Freeze;
- High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Water Transportation, and Logan Express);
- Massport's cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line and Silver Line;
- Logan Airport Employee Transportation Management Association (Logan TMA) services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport vehicle miles traveled (VMT);
- Parking demand and management (including rates and duration statistics);
- Status of long-range ground access management strategy planning; and
- Results of the 2015 Logan Airport Passenger Survey.
- Massport's target HOV mode share along with incentives; and,
- Non-Airport through-traffic;
- Report on Logan Express usage and efforts to increase capacity and usage;
- Report on water transportation to and from Logan Airport; and
- Report on results of ongoing ground access studies.

A-16

Noise Abatement

The 2014 EDR updates the status of the noise environment at Logan Airport in 2012 and 2013, and describes Massport's efforts to reduce noise levels. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring. The 2015 EDR should address the noise issues raised by numerous commenters on the 2014 EDR.

A-17

In 2014, an additional 106 residential units received sound insulation bringing the program total to 11,515 residential units treated, amongst the highest in the nation. Since 2000, the number of daily aircraft operations has declined by almost 27 percent (from 1,355 operations per day in 2000 to 997 operations per day in 2014). This trend reflects an increase in the use of larger aircraft, airline consolidation, and increased efficiencies on the part of airlines. As described throughout this EDR, this evolution towards fewer flights with larger, more efficient and quieter aircraft has yielded substantial environmental benefits. Compared to 2000, in 2014:

- Jet operations made up 86 percent of operations compared to 66 percent;
- Overall operations were down by 25 percent while overall passengers were up by 14 percent; and
- The number of people exposed to DNL 65 dB has declined by 50 percent since 2000. Compared to 2013, the 2014 DNL 65 dB noise contours were larger in most areas around the Airport. The DNL contour was larger over East Boston, Winthrop, and Revere.

There were several temporary FAA- mandated airfield/airspace operating factors that influenced the contour changes in 2014. Due to safety concerns at airports across the US in June of 2014, the FAA temporarily halted the use of head-to-head operations or opposite direction operations, in which planes arrive on a runway in one direction and depart in the opposite direction. When in use at Logan Airport, the procedure has aircraft departing from Runway 15R and landing on Runway 33L during the late night (typically midnight to 5:00 AM) when weather conditions are appropriate, including good visibility and little wind. At Logan Airport, head-to-head operations are an important part of the use of the late night noise abatement runway (Runway 15R-33L) since this keeps operations over Boston Harbor. Use of this procedure was restored in early 2015. FAA also restricted the use of converging runways across the United States in January 2014 due to safety concerns. At Logan Airport, Runways 22L and 22R and Runway 27 were affected by this change. While Runway 22R is in use for departing aircraft, arrivals that would typically be directed to Runway 27 were sent by the FAA Air Traffic Control to arrive on Runway 22L. This restriction has since been lifted. Runway 15L-33R was closed for a short period of time (eight weeks) during the summer of 2014 for Runway Safety Area Improvements. This resulted in aircraft using Runway 15R-33L, Runway 4L, and Runway 22L more frequently in 2014 than in 2013. The construction activity also resulted in short closures of the intersecting Runway 4L-22R and Runway 4R-22L, which increased usage of Runway 15R-33L. An additional factor influencing the contour changes was an increase in overall operations and nighttime operations in 2014 compared to 2013. Nighttime operations increased for passenger flights as airlines expanded destinations and the number of flights per day. Several new international airlines began service at Logan Airport in 2014.

The information in the Noise Abatement chapter is very informative. I expect detailed analysis will be provided in the 2015 EDR and that Massport will consider and address the comments on noise and noise related issues.

A-18

The 2015 EDR should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2015 conditions and compare those conditions to those of 2014 for the following:

- Fleet Mix, including Stage II, Recertified Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft;
- Nighttime operations;
- Runway utilization (report on aircraft and airline adherence with runway utilization goals);
- Preferential runway advisory system (PRAS) tracking; and
- Flight tracks.

A-19

In 2015, the FAA introduced a new combined noise and air quality modeling tool, the Aviation Environmental Design Tool (AEDT), which must be used for all airport projects. The AEDT is a software system that dynamically models aircraft performance in space and time to produce fuel burn, emissions, and noise information. Noise contours for 2015 will be developed using AEDT and compared to the most recent version of the Integrated Noise Model (INM) which has been in place for all previous EDRs and ESPRs. Logan Airport-specific model

adjustments made to account for over-water sound propagation and the propagation of sound to areas of higher terrain may be reported as an add-on to AEDT, if accepted by the FAA. This 2015 EDR should report on the following:

- Changes in annual noise contours and noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the models deployed;
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels; and
- Flight track monitoring noise reports.

A-20

The 2015 EDR should also report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide an update on the noise and operations monitoring system.

A-21

Air Quality/Emissions Reduction

The 2014 EDR provides an overview of airport-related air quality issues in 2014 and also efforts to reduce emissions. The air quality modeling reported in 2014 EDR is based on aircraft operations, fleet mix characteristics, and airfield taxiing times combined with ground support equipment (GSE) usage, motor vehicle traffic volumes, and stationary source utilization rates. Total air quality emissions from all sources associated with Logan Airport in 2014 are significantly less than they were a decade ago. The EDR attributes this downward trend to Massport's longstanding objective to accommodate the demands of increasing passenger and cargo activity levels with fewer aircraft operations generating fewer emissions.

In 2014, calculated emissions of volatile organic compounds (VOC), oxides of nitrogen (NOx), and particulate matter (PM) went up slightly. This was primarily attributable to changes in the modeling software, MOVES2014. Overall, modeled air quality emissions were similar in 2014 to 2013 conditions and followed recent trends. The changes in 2014 modeled air quality emissions, as compared to 2013, are primarily due to technical changes in the model itself. Inputs to the model include aircraft operations, fleet mix characteristics, and airfield taxi times combined with ground service equipment (GSE) usage, motor vehicle traffic volumes, and stationary source utilization rates. Model versions used in the 2014 analyses differed in terms of emission factors, most notably otor vehicle emissions. The modeled air quality conditions in 2014 for Logan Airport were for carbon monoxide (CO), NOx, VOCs, and PM.

- Total VOC emissions went up by 3 percent (1,177 kilograms per day [kg/day]) in 2014 compared to 2013. The increase is primarily due to the corresponding increase in aircraft landing and take-offs (LTOs) and an increase in jet fuel and gasoline usage when compared to 2013. For comparison, total VOC emissions were 1,777 kg/day in 2000.
- Total NOx emissions went up by less than 1 percent in 2014 (4,040 kg/day) compared to 2013. This slight increase in 2014 is mostly attributable to the larger number of air carrier operations during this time period. For comparison, total NOX emissions were 5,707 kg/day in 2000.

- Total CO emissions went down by 5 percent in 2014 (6,987 kg/day) compared to 2013. This decrease is mostly attributable to the decrease in GSE factors and motor vehicle emission factors in accordance with MOVES2014. For comparison, total CO emissions were 13,111 kg/day in 2000.
- Total $PM_{10}/PM_{2.5}$ emissions went up by approximately 3 percent in 2014 (95 kg/day) compared to 2013. This small increase is primarily attributable to the higher emission factors of MOVES2014.
- Total greenhouse gas (GHG) emissions went down by approximately 1 percent in 2014 compared to 2013. This decrease was primarily due to a decrease in vehicle miles traveled (VMT).
- Massport's Air Quality Initiative (AQI) has tracked NOx emissions since the benchmark year of 1999. Total NO_x emissions in 2014 were 722 tons per year (tpy) lower than the 1999 benchmark which represents an overall decrease of 31 percent in NOx emissions since 1999 when the program was initiated. For comparison, NO_x emissions in 2013 were 730 tpy lower than the benchmark.

Massport has also committed to include an inventory of GHG emissions from Logan Airport in the 2015 EDR. GHG emissions should be quantified for aircraft, GSE, motor vehicles and stationary sources using appropriate emission factors and methodologies. The 2015 EDR should include an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The 2015 EDR should provide discussion on progress on the national and international levels to decrease air emissions. It should also include analysis methodologies and assumptions and report on conditions using the FAA's new AEDT model, described above. It will compare results to the most recent version of the Emissions Dispersion Modeling System (EDMS) that has been used in recent EDR/ESPR filings. It should include emissions inventories for CO, NO_x, VOCs, and PM emissions by airline. The 2015 EDR should also report on Massport's and Tenant's Alternative Fuel Vehicle Programs and Logan Airport air quality studies undertaken by Massport or others, as available.

A-22

The results of the 2015 GHG emissions inventory should be compared to the 2014 results. This chapter should also include an update on Massport's efforts to encourage the use of single engine taxiing under safe conditions.

A-23

Water Quality/Environmental Compliance

The 2014 EDR describes Massport's ongoing environmental management activities including National Pollutant Discharge Elimination System (NPDES) compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan (MCP), and tank management. Massport's primary water quality goal is to prevent or minimize pollutant discharges, thus limiting adverse water quality impacts of airport activities. Massport employs several programs to promote awareness of activities that may impact surface and groundwater quality. Programs include implementing best management practices (BMPs) for pollution prevention by Massport, its tenants, and its construction contractors; training of staff and tenants; and a comprehensive stormwater pollution prevention plan. The EDR reports that Massport continues to comply with water quality and other environmental regulations.

The 2015 EDR should identify any planned stormwater management improvements and report on the status of:

- NPDES Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility;
- Jet fuel usage and spills;
- MCP activities;
- Tank management;
- Update on the environmental management plan; and
- Fuel spill prevention.

A-24

Conclusion

I have determined that the 2014 EDR for Logan Airport has adequately complied with MEPA. The EDR provides a comprehensive overview of environmental planning, issues and data. Massport may prepare the 2015 EDR for submission in 2016 consistent with the Scope included in this Certificate.

November 13, 2015
Date

Matthew A. Beaton

Comments received:

10/30/2015	Nancy S. Timmerman
11/05/2015	Town of Milton, Office of Selectmen
11/06/2015	Stephen H. Kaiser, PhD
11/06/2015	The Boston Harbor Association
11/06/2015	Cindy L. Christiansen, PhD
11/10/2015	Bill Deignan, Cambridge Community Development Department

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February 6, 2015

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS ON THE 2012-2013 LOGAN AIRPORT ENVIRONMENTAL DATA REPORT

PROJECT NAME	: 2012-2013 Environmental Data Report
PROJECT MUNICIPALITY	: Boston / Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: December 10, 2014

As Secretary of Executive Office of Energy and Environmental Affairs (EEA), I hereby determine that the Environmental Data Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (MEPA) (M.G.L. c. 30, ss. 61-62I) and with its implementing regulations (301 CMR 11.00).

<u>Background</u>

The environmental review process for Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become, consistent with the objectives of the MEPA regulations, part of the Massachusetts Port Authority's (Massport) long-range planning process. The ESPR provides a "big picture" analysis of the environmental impacts of current and anticipated levels of activities, and presents an overall strategy to minimize impacts. The ESPR is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments associated with project-specific Environmental

Impact Reports (EIR). The ESPR is generally updated on a five-year basis; the most recent ESPR for the year 2011 was filed in April of 2013. Environmental Data Reports (EDRs) (formerly referred to as Annual Updates) are filed in the years between ESPRs. During the review of the 2011 ESPR, Massport requested that the 2012 and 2013 EDRs be combined into one document. The 2012-2013 EDR is the subject of this review. Additionally, this Certificate contains a Scope for the 2014 EDR.

The 2012-2013 EDR provides a comprehensive, cumulative analysis of the effects of all Logan Airport activities based on actual and predicted passenger activity and aircraft operation levels in 2012 and 2013, and presents environmental management plans for addressing areas of concern. The technical studies in the 2012-2013 EDR include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality and environmental management. The 2012-2013 EDR updates and compares the data presented in the 2011 ESPR, and presents activity levels (including aircraft operations and passenger activity) and environmental conditions at Logan Airport for the calendar years 2012 and 2013. It also reports on the status of project mitigation.

Passenger levels at Logan Airport reached a new peak in 2013, exceeding the 2007 historic peak, while aircraft operations at Logan Airport remained well below the historic peak reached in 1998. The 2012-2013 EDR examines the effects of airlines operating much more efficiently with quieter fleets and flying more passengers per aircraft operation. As discussed in the 2011 ESPR, the 2012-2013 EDR anticipates further increases in activity levels and some increases in environmental impacts compared to recent years.

Scope for the 2014 EDR

<u>General</u>

The 2014 EDR should follow the general format of the 2012-2013 EDR status report. The 2014 EDR should include an Executive Summary and Introduction, similar to previous ESPRs and EDRs. Massport must provide background information on the environmental policies and planning that form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport to provide context for reviewing agencies and the public. A1

The 2014 EDR should provide an update on conditions at Logan Airport for calendar year 2014, including passenger and aircraft operation activity levels. It should continue to serve as a background/context against which projects at Logan Airport can be evaluated. It should also report on the cumulative effects of Logan Airport operations and activities, compared to previous years, as appropriate. It should provide a status report on Massport's proposed planning initiatives, projects, and mitigation measures. A2

The technical studies in the 2014 EDR should include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. The 2014 EDR must also A3

respond to those issues explicitly noted in this Certificate and the comments received on the 2012-2013 EDR.

A distribution list for the 2014 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan ESPR (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary. A4

Response to Comments

The 2014 EDR Responses to Comments section should address all of the substantive comments from the letters listed at the end of this Certificate. The Response to Comments chapter included in the 2012-2013 EDR is well-constructed and cross-referenced. I encourage Massport to use the same format in the 2014 EDR. A5

The majority of comments received on the 2012-2013 EDR focus on noise related issues, including measurement of noise, modeling of noise contours, and noise abatement, and emission reduction issues. In addition to responding to these comments, the 2014 EDR should continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commenters where appropriate. A6

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This chapter presents aviation activity statistics for Logan Airport in 2012 and 2013. Logan Airport is New England's primary domestic and international airport, operating as an origin-destination airport, rather than a connecting hub for major airlines. In 2012, Logan Airport was the 23rd busiest commercial aviation facility in North America ranked by aircraft operations, and the 20th busiest in North America ranked by number of passengers. In 2013, Logan Airport was the 21st busiest commercial aviation facility in North America ranked by aircraft operations, and remained the 20th busiest in North America ranked by number of passengers.

The total number of air passengers at Logan Airport increased by 1.1 percent to 29.2 million in 2012 and by 3.4 percent to 30.2 million in 2013, compared to 28.9 million in 2011. The 2013 passenger level represents a new record high for Logan Airport. At the same time, the total number of aircraft operations fell from approximately 368,987 in 2011 to 354,869 in 2012, a decrease of 3.8 percent. In 2013, aircraft operations increased by 1.8 percent to 361,339. Despite the increase in airport operations from 2012 to 2013, aircraft operations at Logan Airport remained well below the 487,996 operations accommodated in 2000 and the historic peak of 507,449 operations reached in 1998. Passenger aircraft operations, which accounted for 91 percent of total aircraft operations, increased by 2.4 percent in 2013 after decreasing by 3.9 percent in 2012, compared to 2011 levels.

General aviation (GA) operations which is defined as aviation activity other than commercial airline activity, accounted for seven percent of total operations in 2013. GA decreased by 0.4 percent in 2012 and decreased by 5.1 percent in 2013. The 26,682 GA operations in 2013 remain below the 35,233 GA operations that Logan Airport handled in 2000.

Airline efficiency continued to increase as the average total number of passengers per aircraft operation increased from 78.3 percent in 2011 to 82.4 percent in 2012 and 83.6 percent in 2013. The average number of passengers per aircraft operation in 2012 and 2013 represented approximately 74 percent of average aircraft seat capacity. At Logan Airport, the increasing number of passengers per flight reflects a shift away from smaller aircraft and rising load factors because airlines have reduced or restricted capacity growth after several airline mergers.

Air cargo volumes, including shipments transported in the belly compartments of passenger aircraft, decreased from 562 million pounds in 2011 to 553 million pounds in 2012, a decline of 1.4 percent compared to 2011. Over the same period, all-cargo aircraft operations fell by 16.5 percent to 5,237 million pounds. All-cargo aircraft operations fell at a faster rate than cargo volumes, because all-cargo airlines introduced larger capacity aircraft into service at Logan Airport. In 2013 air cargo volumes increased by 0.8 percent to 558 million pounds and all-cargo operations increased by 3.2 percent to 5,403 million pounds, compared to 2012.

The 2014 EDR should report on airport activity levels and aircraft operations, including: A7

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
- Passenger activity levels;
- Cargo and mail activities;
- Compare 2014 aircraft operations, cargo/mail operations, and passenger activity levels to 2013 activity levels; and
- Report on national aviation trends in 2014 and compare to trends at Logan Airport.

It should also report on Massport's activity level forecasts that will become the basis for the planning and impact sections that follow and for Massport's strategic planning initiatives for the future ESPR. Massport should address comments related to activity levels in the 2014 EDR. A8

Sustainability at Logan Airport

The 2012-2013 EDR describes Massport's airport wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy, which articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision.

The 2012-2013 EDR describes Massport's continued efforts including Massport-wide sustainability. In 2013, Massport was awarded a grant by the Federal Aviation Administration (FAA) to prepare a Sustainability Management Plan (SMP) for Logan Airport. The Logan

Airport SMP planning effort began in May 2013, and is expected to be completed in 2015. The 2012-2013 EDR indicates that the Logan Airport SMP is intended to promote and integrate sustainability, formulate a list of priority initiatives, and engage employees and tenants in the process. The 2012-2013 EDR provides an excellent overview of Massport's commitment to incorporate sustainability into all aspects of Massport's activities: Planning and Design; Construction; Operations, Maintenance and Management; and Monitoring of Environmental Performance. It also identifies specific practices to reduce impacts associated with construction and efforts to address energy intensity, percentage of renewable energy, and GHG reductions.

A specific example includes compliance with the Leading by Example Executive Order which requires state agencies to procure 15 percent of their electricity from renewable resources by 2012. The Leading by Example program has influenced Massport's own operations including its offices, heating plants, and garages resulting in Massport receiving the Leading by Example award in 2008. As part of the Leading by Example program, all new construction and major renovations over 20,000 square feet constructed by Commonwealth agencies must meet the Massachusetts LEED Plus green building standard established by the Massachusetts Sustainable Design Roundtable.

I commend Massport for its commitment and expect progress on the SMP will be incorporated into subsequent EDRs and ESPRs. The focus in the 2014 EDR should include reporting on data, identifying goals and priorities for specific Massport and tenant projects at Logan Airport that have undergone MEPA review to include energy efficiency/greenhouse gas reduction, water conservation, and waste management and recycling. A9

The 2014 EDR should report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review, including whether they are under construction or completed. The status of mitigation commitments made in the Section 61 Findings for the following projects should also be reported: A10

- West Garage/Central Garage (EEA #9790)
- International Gateway (EEA #9791)
- Logan Airside Improvements Planning Project (EEA #10458)
- Terminal A Replacement Project (EEA #12096)
- Southwest Service Area Redevelopment Program/Rental Car Center (EEA #14137)
- Logan Runway Safety Area Improvements Project (EEA #14442)

Planning

The Airport Planning chapter in the 2012-2013 EDR provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2012 and 2013. It also describes future planning, construction, and permitting activities and initiatives. It includes the following Airport Projects:

- Southwest Service Area (SWSA) Redevelopment Program (EEA #14137);
- Logan Airport Runway Safety Area (RSA) Improvements Project at Runway Ends 33L and 22R (EEA #14442);

- Logan Airport Runway 33L Light Pier Replacement Project (EEA #14442);
- Green Bus Depot (EEA #14629);
- Martin A. Coughlin (East Boston-Chelsea) Bypass Project (EEA #14661);
- Renovations and Improvements at Terminal B;
- Terminal B Garage Improvement Project;
- North Service Area Roadway Corridor Project;
- Greenway Connector Project a pedestrian/bicycle path connecting the Bremen Street Park path to the future City of Boston pedestrian/bicycle path; and
- Hangar Upgrade Projects.

At the end of 2013, Massport initiated the Disaster and Infrastructure Resiliency Planning (DIRP) Study for Logan Airport, the Port of Boston, and Massport's waterfront assets in South and East Boston according to the 2012-2013 EDR. The DIRP Study includes a hazard analysis, modeling projected sea-level rise and storm surge, and projections of temperature and precipitation and anticipated increases in extreme weather events. The study is nearing completion. The 2014 EDR should address the DIRP Study and identify which recommendations Massport will implement in the short term to increase the resiliency of its facilities to the potential effects of climate change. A11

Massport is in the process of developing a long-term parking management plan for Logan Airport. The Long-Term Parking Management Plan will lay out a multi-part strategy for efficiently managing parking supply, pricing, and operations – both at Logan Airport and at off-Airport locations controlled by Massport – to maximize access for transit and shared-ride vehicles while minimizing both drive-and-park and pick-up/drop-off modes. The 2014 EDR should provide updates on this plan. A12

The 2014 EDR should also continue to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport also must accommodate and guide tenant development. Therefore, the 2014 EDR should also describe the status of planning initiatives for the following areas: A13

- Roadway Corridor Project;
- Airport Parking;
- Terminal Area;
- Airside Area;
- Service and Cargo Areas; and
- Airport Buffers and Landscaping.

The 2014 EDR should provide a status report on long-range planning activities. This chapter should include the status and effectiveness of the ground access changes, including roadway and parking projects, that will consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on external streets in adjacent neighborhoods. A14

Regional Transportation

The 2012-2013 EDR describes activity levels at New England's regional airports in 2012 and 2013 and provides an update on regional planning activities, including long-range transportation efforts.

Overall, aviation activity at New England's regional airports decreased in 2012 and 2013. In 2012, the total number of air passengers utilizing New England's commercial service airports, including Logan Airport, decreased by 1.3 percent from 44.7 million in 2011 to 44.1 million annual air passengers. The decline in the region's passenger traffic largely reflects airline service reductions at many of the regional airports in 2012. Airlines have attempted to maintain tighter capacity control, which has resulted in ongoing service cuts at various secondary and tertiary airports across the nation. While passenger traffic at Logan Airport increased slightly in 2012, reduced passenger levels at regional airports resulted in an overall decline for the region. In 2013, however, overall passenger traffic at New England commercial airports recovered somewhat, increasing 2.8 percent from 44.1 million to 45.4 million passengers. Passenger traffic at New England airports in 2013 was the highest since the economic downturn in 2008. In 2013, total passenger traffic at the regional airports increased 1.6 percent from the previous year, while passenger traffic at Logan Airport increased by 3.4 percent.

The 2014 EDR should describe Logan Airport's role in the region's intermodal transportation system by reporting on the following:

Regional Airports
- 2014 regional airport operations, passenger activity levels, and schedule data within an historical context;
- Status of plans and new improvements as provided by the regional airport authorities;
- Ground access improvements; and
- Role of the Worcester Regional Airport and Hanscom Field in the regional aviation system and Massport's efforts to promote these airports.

Regional Transportation System
- Massport's role in managing the regional transportation facilities within the restructured Massachusetts Department of Transportation (MassDOT);
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
- Report on metropolitan and regional rail initiatives and ridership.

A15

Ground Access to and from Logan Airport

The 2012-2013 EDR reports on transit ridership, roadways, traffic volumes, and parking for both 2012 and 2013. Specifically, the average daily vehicular traffic on Airport roadways decreased by 0.2 percent from 99,449 in 2011 to 99,281 in 2012, and then increased by 3.5 percent to 102,771 between 2012 and 2013. The 2012-2013 EDR also updates information on the Logan Parking Freeze limit which is set at 21,088, of which 18,415 are dedicated to commercial

parking spaces and 2,673 are dedicated to employee parking spaces. The EDR indicates that Massport continued to be in full compliance with the Parking Freeze throughout 2012 and 2013.

The 2012-2013 EDR includes key findings for ground access activity to and from the Airport which include:

- Massachusetts Bay Transportation Authority (MBTA) Silver Line bus boardings at the Airport continued to grow, based on ridership estimates.
- In 2012, Blue Line transit boardings at Airport Station increased about seven percent over 2011 levels. In 2013, MBTA Blue Line ridership increased six percent over 2012 levels.
- In 2012, ridership levels on all types of water transportation to the Airport remained flat in comparison to the previous year. Ridership on the MBTA ferry continues to decline, while private water taxi use has grown slightly since 2007. In 2013, ridership on private water taxis increased by three percent.
- In 2012, air passengers using Logan Express bus service increased 10 percent compared to 2011 levels; employee use of Logan Express increased by 16 percent and non-employee passengers increased nearly five percent. In 2013, non-employee passenger ridership increased nearly eight percent over 2012 levels, and employee passenger activity increased almost two percent.
- In September 2013, Massport solicited an operator for a Back Bay express shuttle bus service, which commenced in April 2014. The Back Bay Logan Express, provides improved service to those transit riders who are affected by the two-year Government Center MBTA Station closure and increases high occupancy vehicle (HOV) use from the inner Boston area.

The 2014 EDR should report on the following conditions and provide a discussion of analysis in 2014 and compare them to 2013:

- Detailed description of compliance with Logan Airport Parking Freeze;
- High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Water Transportation, and Logan Express);
- Massport's cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line and Silver Line;
- Logan Airport Employee Transportation Management Association (Logan TMA) services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport vehicle miles traveled (VMT);
- Parking demand and management (including rates and duration statistics);
- Status of long-range ground access management strategy planning; and
- Results of the 2013 Logan Airport Passenger Survey.
- Massport's target HOV mode share along with incentives; and,
- Non-Airport through-traffic;

A16

Noise Abatement

The 2012-2013 EDR updates the status of the noise environment at Logan Airport in 2012 and 2013, and describes Massport's efforts to reduce noise levels. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring. The 2014 EDR should address the noise issues raised by numerous commenters on the 2012-2013 EDR

Compared to 2011, the 2012 Day-Night Average Sound Level (DNL) 65-decibel (dB) contours were slightly larger in East Boston, Revere, South Boston, and Winthrop and smaller over Boston Harbor towards Long Island and south towards Columbia Point. The 2012 contours remained substantially smaller than the 2000 contours. There are several factors that influenced the contour changes, including: Runway 15R-33L, the nighttime noise abatement runway, was temporarily closed from June 16, 2012 through October 2, 2012 to allow for the second and final period of construction of the enhanced Runway 33L RSA. There were also partial construction closures of the runway before and after this period. Typically, this runway is used during these periods for head-to-head operations (arrivals to Runway 33L and departures from Runway 15R) at night, which keeps air traffic over Boston Harbor, and away from the community. The 2012 RSA construction closure was extended for longer period than in 2011, which also extended the use of other runways for nighttime operations during 2012. During this period, night operations primarily used Runway 22R and Runway 9 for departures and Runway 4R, 27, and 22L for arrivals.

Compared to 2012, the 2013 DNL 65 dB contours were slightly larger in East Boston and slightly smaller in Revere, South Boston, and Winthrop. The 2013 contours remained substantially smaller than the 2000 contours. There are several factors that influenced the contour changes, including:

- Runway use in 2013 was reflective of a typical year (return to pre-construction conditions), with an increased use (compared to 2012) of Runway 15R-33L and Runway 27;
- The availability of all runway configurations in 2013, resulted in lower levels of arrivals to Runways 22L, 27, and 4R;
- Due to the runway closure, the overall number of people exposed to DNL values greater than 65 dB increased to 4,736 people in 2012 from 3,947 people in 2011 (an increase of 789 people); and
- In 2013 with runway use back to pre-construction patterns, the overall number of people exposed to DNL values greater than 65 dB decreased to 4,307 people in 2013 from 4,736 people in 2012 (a decrease of 429 people).

The number of people residing within the DNL 70 dB contour increased from 130 people in 2011 to 200 people in 2012 and returned to 130 people in 2013. These levels are still well below the number of people exposed in the year 2000 when 17,745 people were exposed to DNL noise levels greater than 65 dB and 1,551 people were exposed to DNL levels greater than 70 dB. All of the residences exposed to levels greater than DNL 65 dB in 2012 and 2013 have been eligible to participate in Massport's residential sound insulation program (RSIP). Participation in the program is voluntary and Massport has provided sound insulation to all of homeowners who

have chosen to participate. An additional 76 residential units received sound insulation treatment in 2013 bringing the program total to 11,409 residential units. Massport will continue to seek funding for this program.

Massport is participating in a FAA aircraft noise study as part of the Airside Improvement Project mitigation. The primary focus of the Boston Logan Airport Noise Study (BLANS) is to determine viable ways to reduce noise from aircraft operations to and from Logan Airport without diminishing airport safety and efficiency. The Runway Navigation (RNAV) departure portions of Phase 1 of the project, first implemented in 2010, continued to be utilized in 2012 and 2013. The 2012-2013 EDR detailed the Flight Track Monitoring reports in Appendix of Noise Abatement.

The information in the Noise Abatement chapter is very informative and I encourage Massport to continue with detailed analysis in the 2014 EDR. I strongly advise Massport to consider and address the comments on noise and noise related issues.

A17

The 2014 EDR should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2014 conditions and compare those conditions to those of 2013 for the following:

- Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft;
- Nighttime operations;
- Runway utilization (report on aircraft and airline adherence with runway utilization goals);
- Preferential runway advisory system (PRAS) tracking; and
- Flight tracks.

A18

The 2014 EDR should also report on 2014 conditions and compare those to 2013 conditions for the following noise indicators:

- Using the FAA's most current version of the Integrated Noise Model (INM), and RealContoursTM and RealProfilesTM, produce an accurate set of Day-Night Sound Level (DNL) noise contours.
- Update on FAA's combined air quality and noise modeling tool (Aviation Environmental Design Tool - AEDT)
- Noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of RealContoursTM and RealProfilesTM;
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels;
- Installation and benefits of the new noise monitoring system; and
- Flight track monitoring noise quarterly reports.

The 2014 EDR should also report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide a status update on the new noise and operations monitoring system. A19

Air Quality/Emissions Reduction

The 2012-2013 EDR provides an overview of airport-related air quality issues in 2012 and 2013 and also efforts to reduce emissions. The air quality modeling reported in 2012-2013 EDR is based on aircraft operations, fleet mix characteristics, and airfield taxiing times combined with ground support equipment (GSE) usage, motor vehicle traffic volumes, and stationary source utilization rates. Motor vehicle emissions for the 2012 analysis were obtained from the United States Environmental Protection Agency's (EPA's) MOBILE model (MOBILE6.2.03) combined with MassDEP-recommended motor vehicle fleet mix data, operating conditions, and other Massachusetts-specific input parameters. The most up-to-date EPA mobile model, Motor Vehicle Emission Simulator (MOVES), was used to develop 2013 motor vehicle emission factors. For comparative purposes, both MOBILE and MOVES were used to generate the 2013 motor vehicle emission factors.

The following is a summary of modeled air quality conditions for Logan Airport in the 2012 to 2013 time-period:

- Total volatile organic compound (VOC) emissions in 2012 were 1,080 kilograms per day (kg/day), or approximately three percent lower than 2011 levels. By comparison, total VOC emissions in 2013 were 1,138 kg/day, or 5 percent higher than 2012 levels. For comparison, total VOC emissions were 1,777 kg/day in 2000.
- Total emissions of oxides of nitrogen (NO_x) in 2012 were 4,099 kg/day, or less than one percent higher than 2011 levels. However, total emissions of NO_x in 2013 were 4,020 kg/day, or two percent lower than 2012 levels. For comparison, total NO_x emissions were 5,707 kg/day in 2000.
- Total emissions of carbon monoxide (CO) in 2012 were 6,739 kg/day, or three percent lower than 2011 levels. However, total emissions of CO in 2013 were 7,340 kg/day, or nine percent higher than 2012 levels. For comparison, total CO emissions were 13,111 kg/day in 2000.
- Total emissions of particulate matter $(PM)_{10}/PM_{2.5}$ increased in 2012 by approximately seven percent to 72 kg/day compared to 2011 levels. This particular increase is unique and is mostly attributable to a change the MOBILE6.2.03 model. Total modeled emissions of $PM_{10}/PM_{2.5}$ again increased in 2013 by approximately 28 percent to 92 kg/day compared to 2012 levels. This increase is primarily attributable to the updated computer modeling (i.e., Emissions and Dispersion Modeling System [EDMS] and MassDEP-preferred model –MOVES) used to calculate aircraft and motor vehicle emissions.
- With respect to Massport's Air Quality Initiative (AQI) 1999 benchmark, total NO_x emissions in 2012 were 698 tons per year (tpy) lower than the benchmark and in 2013 emissions were 730 tpy lower than the benchmark. This represents an overall decrease of 31 percent in NO_x emissions since 1999. For comparison, total NO_x emissions in 2000 were 51 tpy lower than the benchmark or a decrease of 2 percent since 1999.

The year 2013 marks the seventh consecutive year in which Massport has voluntarily prepared a greenhouse gas (GHG) emissions inventory for the EDR/ESPR. The 2012 and 2013 GHG emission inventory was again prepared following methodological guidance by the Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP). Total Logan Airport GHG emissions in 2012 were approximately three percent lower than 2011 levels primarily due to lower fuel consumption by stationary sources. Total Logan Airport GHG emissions in 2013 were approximately six percent higher than 2012 levels primarily due to the increase in usage of passenger ground access vehicles on off-airport roadways. In 2012, Massport-related emissions represented 10 percent of total GHG emissions at the Airport; tenant-based emissions represented approximately 69 percent; electrical consumption represented 14 percent; and passenger vehicle emissions represented six percent. Similarly, in 2013, Massport-related emissions represented 13 percent of total GHG emissions at the Airport, tenant-based emissions represented approximately 66 percent, electrical consumption represented 10 percent, and passenger vehicle emissions represented 10 percent.

The 2014 EDR should include an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The 2014 EDR should provide discussion on progress on the national and international levels to decrease air emissions. It should also include analysis methodologies and assumptions and report on 2014 conditions using the most recent versions of the EDMS and MOVES models. The 2014 EDR should include an emissions inventory for CO, NO_x, VOCs, and PM. It should include NO_2 monitoring and identify NO_x emissions by airline. A20

The 2014 EDR should also report on the following AQI for 2014: A21

- AQI Emissions Monitoring and Tracking;
- Massport's and Tenant's Alternative Fuel Vehicle Programs; and
- The status of Logan Airport air quality studies undertaken by Massport or others, as available.

Massport has also committed to include an inventory of GHG emissions from Logan Airport in 2014. GHG emissions should be quantified for aircraft, GSE, motor vehicles and stationary sources using emission factors and methodologies outlined in the MEPA Greenhouse Gas Emissions Policy and Protocol. The results of the 2014 GHG emissions inventory should be compared to the 2013 results. This chapter should also include an update on Massport's efforts to encourage the use of single engine taxiing under safe conditions. A22

Water Quality/Environmental Compliance

The 2012-2013 EDR describes Massport's ongoing environmental management activities including National Pollutant Discharge Elimination System (NPDES) compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan (MCP), and tank management.

The 2014 EDR should report on the 2014 status of:

- NPDES Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility;
- Jet fuel usage and spills;
- MCP activities;
- Tank management;
- Update on the environmental management plan; and
- Fuel spill prevention.

It should also identify any planned stormwater management improvements.

A23

Conclusion

I have determined that the 2012-2013 EDR for Logan Airport has adequately compiled with MEPA. Massport may prepare a 2014 EDR for submission in 2015 consistent with the scope included in this Certificate.

February 6, 2015
Date

Matthew A. Beaton

Comments received:

01/14/2015	Frank J. Ciano
01/26/2015	Cindy L. Christiansen
01/26/2015	City of Somerville, Mayor Joseph Curtatone
01/27/2015	The Boston Harbor Association
01/27/2015	Nancy S. Timmerman
02/02/2015	Massachusetts Department of Public Health

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June 14, 2013

CERTIFICATE OF THE SECRETARY OF ENVIRONMENTAL AFFAIRS
ON THE
2011 LOGAN AIRPORT ENVIRONMENTAL STATUS AND PLANNING REPORT

PROJECT NAME	: 2011 Environmental Status and Planning Report
PROJECT MUNICIPALITY	: Boston and Winthrop
PROJECT WATERSHED	: Boston Harbor
EOEA NUMBER	: 3247
PROJECT PROPONENT	: Massachusetts Port Authority (Massport)
DATE NOTICED IN MONITOR	: April 24, 2013

As Secretary of Environmental Affairs, I hereby determine that the Environmental Status and Planning Report submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62H) and with its implementing regulations (301 CMR 11.00). A-1

The environmental review process for Logan Airport has been structured to occur on two levels: airport-wide and project-specific. The Environmental Status and Planning Report (ESPR) has evolved from a largely retrospective status report on airport operations to a broader analysis that also provides a prospective assessment of long-range plans. It has thus become, consistent with the objectives of the MEPA regulations, part of Massport's long range planning. The ESPR provides a "big picture" analysis of environmental impacts associated with current and anticipated levels of activities, and presents an overall mitigation strategy aimed at avoiding increases in such impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project-specific Environmental Impact Reports (EIR). The ESPR is generally updated on a five year basis, with much less detailed Environmental Data Reports (EDR) (formerly Annual Updates) filed in the years between ESPRs. The 2011 ESPR is the subject of this review. In addition, Massport has requested to combine the 2012-2013 EDRs into one document. I have considered and granted this request. This Certificate also contains a Scope for the 2012-2013 EDR. A-2

A-3 In general, the ESPR has responded to the scope. In particular, the 2011 ESPR contains a wealth of useful data on activity levels and impacts, and lays out a forecast for trends in the future years. The technical studies in the 2011 ESPR include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. The 2011 ESPR updates and compares the data presented in the 2010 EDR, and presents activity levels (including aircraft operations and passenger activity) and environmental conditions at Logan Airport for calendar year 2011. In addition to the annual report on 2011 conditions, two other primary functions of this 2011 ESPR are to provide a discussion of future activity levels at Logan Airport through the year 2030 based on an updated forecast, and to predict the associated potential environmental conditions at the Airport in 2030. The 2011 ESPR also presents historical data on the environmental conditions at Logan Airport dating back to 1990 in instances where historical information is available. Historical data are included in the technical appendices. Overall the 2011 ESPR provides a comprehensive, cumulative analysis of the effects of all Logan Airport activities based on actual and predicted passenger activity and aircraft operation levels in 2011 and 2030 and presents environmental management plans for addressing areas of environmental concern.

The majority of comments received on the 2011 ESPR focused on noise issues, including measurement of noise, modeling of noise contours, and noise abatement. In addition to responding to these comments, the 2012-2013 EDR should also report on the progress and other refinements for tracking noise and abatement efforts, as further described in the Scope below.

Background

In 1979, the Secretary of the Executive Office of Environmental Affairs issued a Certificate requiring Massport to define, evaluate, and disclose, every three years, the impact of long-term growth at the airport through a Generic Environmental Impact Report (GEIR). The Certificate also required the submission of interim Annual Updates to provide data on conditions for the years between the GEIRs. The GEIR provided projections of environmental conditions where the cumulative effects of individual projects could be understood. The Secretary's Certificate on the *1997 Annual Update* proposed a revised environmental review process for Logan Airport. As a result, Massport evaluates the cumulative impacts associated with airport activities through preparation of an ESPR every five years and provides data updates annually through the EDRs.

Review of the 2011 ESPR and Scope for the 2012-2013 EDR

Framework for the 2011 ESPR

Massport has adopted a new, long-term forecast for the long-range planning horizon,

2030. Previous forecasts for the 1999 ESPR and the 2004 ESPR forecasts anticipated that Logan Airport would be handling 37.5 million annual passengers in 2015 and 42.8 million passengers in 2020, respectively. The 2011 ESPR revisits previous forecasts and revises them based on current and predicted conditions, and to consider a more distant time horizon.

For this 2011 ESPR, Massport updated the Logan Airport long-range forecast with 2015, 2020, and 2030 as the forecast years. Three scenarios were also developed (Low, Moderate, and High). Massport views the Moderate forecast scenario as the most likely forecast of future activity levels at Logan Airport. Massport's forecast under the Moderate scenario predicts that there will be 39.8 million passengers using Logan Airport in 2030. The updated forecast takes into account slower-than-anticipated passenger growth (compared to previous forecasts), the increasing efficiency of aircraft (higher passenger load factors), and fleet mix trends, including a growing prevalence of larger capacity jet aircraft. This 2011 ESPR examines both airside and landside activities, including planned Massport projects, and projects being carried out by others that affect the Airport, such as the FAA's Boston Logan Airport Noise Study (BLANS). Future year projections incorporate available information about projects that have undergone or are currently under MEPA review.

Cumulative analysis of airport activities are based on actual and projected passenger activity levels, aircraft operations, and the facilities and services needed to serve them. Analysis conditions for current and future years are used to assess environmental conditions and to develop, evaluate, and adjust environmental management actions.

General

The 2012-2013 EDR should follow the general format of the 2010 EDR status report on Massport's planning initiatives, projects, and mitigation measures. The 2012-2013 EDR should include an Executive Summary and Introduction, similar to previous ESPRs and EDRs. A-4

Massport must provide necessary background information to allow reviewing agencies and the public to understand the environmental policies and planning which form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport. A-5

Specifically, the 2012-2013 EDR should provide an update on conditions at Logan Airport for calendar year 2012 and 2013. The EDR should continue to serve as a background/context against which projects at Logan Airport can be evaluated. It should also report on the cumulative effects of Logan Airport operations and activities, compared to previous years, as appropriate. A-6

The 2012-2013 EDR should report on 2012 and 2013 passenger and aircraft operation activity levels. This will be followed by a status report on Massport's proposed planning initiatives and projects and mitigation. In this way, Massport should provide the necessary background information to allow the reviewer to understand the environmental policies and A-7

A-7 cont. planning which form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport.

A-8 The technical studies in the 2012-2013 EDR should include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. The 2012-2013 EDR must also respond to those issues explicitly noted in this Certificate and the comments received on the 2011 ESPR.

A-9 A distribution list for the 2012-2013 EDR (indicating those receiving documents, CDs, or Notices of Availability) should be provided in the document. This section must also include copies of all ESPR and EDR Certificates issued since the 2004 Logan Environmental Status and Planning Report (issued on August 16, 2006) to provide context for reviewers. Supporting technical appendices should be provided as necessary.

Responses to Comments

A-10 The 2012-2013 EDR must include responses to comments that address all of the substantive comments from the letters listed at the end of this Certificate. The responses to comments included in the 2011 ESPR is well-constructed and cross-referenced. Massport may follow the same format in addressing comments in the 2012-2013 EDR.

A-11 The majority of comments received on the 2011 ESPR focus on noise related issues, including measurement of noise, modeling of noise contours, and noise abatement, and emission reduction issues. In addition to responding to these comments, the 2012-2013 EDR should continue to report on the refinements to noise tracking and abatement efforts. Massport should consult directly with individual commenters where appropriate.

Activity Levels

The Activity Levels chapter provides a solid analysis of major activity issues and the technical appendix contains useful and detailed information. This section in the 2011 ESPR specifically presents aviation activity statistics for Logan Airport in 2011 and compares activity levels to the prior year. The specific activity measures discussed include air passengers, aircraft operations, fleet mix, and cargo/mail volumes. This chapters also provides Massport's long-range 2030 aviation forecast for Logan Airport.

A-12 The 2012-2013 EDR must report on airport activity levels, including information on aircraft operations, including fleet mix, passenger activity levels, and cargo and mail operations. A primary purpose of this section of the 2012-2013 EDR will be to report on airport activity levels for 2012 and 2013, including:

- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;

- Passenger activity levels;
- Cargo and mail activities; A-12 cont.
- Compare 2012 and 2013 aircraft operations, cargo/mail operations, and passenger activity levels to 2011 activity levels; and
- Report on national aviation trends in 2012/2013 and compare to trends at Logan Airport.

It should also report on Massport's activity level forecasts that will become the basis for the planning and impact sections that follow and for Massport's strategic planning initiatives over the next few years. A-13 In addition to reporting the analysis of major activity issues, I advise Massport to consider and attempt to address all comments related to activity levels in the 2010 EDR. A-14

Planning

The Airport Planning chapter in the 2011 ESPR provides an overview of planning, construction, and permitting activities that occurred at Logan Airport in 2011. It also describes known future planning, construction, and permitting activities and initiatives.

The 2012-2013 EDR should continue to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport also must accommodate and guide tenant development. Therefore, the 2012-2013 EDR should describe the status of planning initiatives for the following areas: A-15

- Roadway Corridor Project;
- Airport Parking;
- Terminal Area;
- Airside Area;
- Service and Cargo Areas; and
- Airport Buffers and Landscaping.

The 2012-2013 EDR should continue to assess the status of long-range planning activities. The chapter should report on the status of public works projects implemented by other agencies within the boundaries of Logan Airport. A-16 The chapter will also report on the status and effectiveness of the ground access related changes including roadway and parking projects, which consolidate and direct airport-related traffic to centralized locations and minimize airport-related traffic on external streets in adjacent neighborhoods. A-17

Regional Transportation

In general, the 2011 ESPR has met the requirements with respect to regional transportation issues. It describes activity levels at New England's regional airports in 2011 and updates recent regional planning activities. A-18

Overall, aviation activity at New England's regional airports increased in 2011, because the regional airports experienced a modest recovery after the 2008/2009 Economic Recession. Highlights for the regional airports and the status of long-range regional transportation planning efforts in the region which are relevant to Massport's three airports as well as the regional transportation network are provided in the 2011 ESPR.

A-19 The 2012-2013 EDR should describe Logan Airport's role in the region's intermodal transportation system by reporting on the following:

Regional Airports

- 2012 and 2013 regional airport operations, passenger activity levels, and schedule data within an historical context;
- Status of plans and new improvements as provided by the regional airport authorities;
- Ground access improvements to the regional airports; and
- The role that Worcester Regional Airport and Hanscom Field play in the regional aviation system and Massport's efforts to promote these airports.

Regional Transportation System

- Massport's role in managing the regional transportation facilities within the restructured Massachusetts Department of Transportation (MassDOT);
- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
- Report on metropolitan and regional rail initiatives and ridership.

Ground Transportation

The 2011 ESPR reported on transit ridership, roadways, traffic volumes and parking for 2011. It also provides forecasts for traffic volumes, parking, and VMT for the year 2030.

A-20 The 2012-2013 EDR should report on 2012 and 2013 conditions and provide a comparison of 2012 and 2013 findings to those of 2011 for the following:

- Detailed description of compliance with Logan Airport Parking Freeze;
- High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, Scheduled, Unscheduled, Water Transportation, and Logan Express);
- Logan Airport Employee Transportation Management Association (Logan TMA) services;
- Logan Airport gateway volumes;
- On-airport traffic volumes;
- On-airport vehicle miles traveled (VMT);
- Parking demand and management (including rates and duration statistics);
- Status of long-range ground access management strategy planning; and

- Results of the 2013 Logan Airport Passenger Survey.

The 2012-2013 EDR should also present a discussion of the following topics:

- Definition of HOV;
- Massport's target HOV mode share along with incentives;
- Non-Airport through-traffic;
- Massport's cooperation with other transportation agencies to increase transit ridership to and from Logan Airport via the Blue Line and Silver Line;
- Report on Logan Express usage and efforts to increase capacity and usage;
- Progress on enhancing water transportation to and from Logan Airport;
- Progress on rental car consolidation;
- Report on results of ground access study; and
- Strategies for enhancing services and increasing employee membership in the Logan Airport TMA.

A-20 cont.

Noise

The 2011 ESPR updates the status of the noise environment at Logan Airport in 2011, and describes Massport's efforts to reduce noise levels. It also provides noise contour population counts for 2030. The technical appendix contains useful and detailed information, while the main document provides a solid analysis of major noise issues. Many of the issues raised in the noise analysis are ongoing and require continuous monitoring. The future 2012-2013 EDR represents an appropriate forum to serve this updating function and to address the noise issues raised by numerous commenters on the 2011 ESPR. A-21

In 2011 the following changes occurred in the Airport noise environment:

- Compared to 2010, the 2011 DNL decibel (dB) contours were smaller in East Boston and over Boston Harbor toward Hull. The DNL 65 dB contour was slightly larger in Revere, South Boston, and in most of Winthrop for 2011.
- The overall number of people exposed to DNL values greater than 65 dB increased to 3,947 people in 2011 from 3,830 people in 2010 (an increase of 117 people). The number of people residing within the DNL 70 dB contour remained at 130 people. These levels are well below the numbers of people exposed in the year 2000 when 17,745 people were exposed to DNL noise levels greater than 65 dB and 1,551 people were exposed to DNL levels greater than 70 dB.
- In 2011, Massport provided sound insulation to 114 homes, 84 percent of which were in Chelsea. The focus of the program in Chelsea was to fulfill federal and state mitigation commitments related to the opening of Runway 14-32. Since the inception of Massport's residential sound insulation program (RSIP), 11,333 homes have received sound insulation treatment in East Boston, South Boston, Winthrop, Revere, and Chelsea.

Based on the 2030 forecast of aircraft operations and expected aircraft fleet mix, the following conditions are expected in 2030:

- There is forecast to be a larger number of operations and a higher percent of jet fleet activity than in 2011. The higher level of operations is not a capacity challenge as the Airport has operated in the past with over 1,300 operations per day.
- The 2030 fleet mix consists of 81 percent commercial jets whereas the 2011 fleet mix consists of 78 percent commercial jets. The 2000 fleet mix had a lower proportion of commercial jets at 62 percent of the fleet.
- Total operations are expected to increase by 29 percent or 290 operations per day from 2011 to 2030, from 1,011 operations per day in 2011 to 1,301 operations per day in 2030. Compared to 2000, which is the last year that Logan Airport had over 1,300 daily operations, 2030 is forecasted to have 54 fewer daily operations (1,355 in 2000 and 1,301 in 2030). Daytime commercial operations are projected to increase by 254 operations per day from 819 in 2011 to 1,073 in 2030, however this is still fewer than the 1,142 daytime operations in 2000. Nighttime commercial operations are projected to increase from 114 in 2011 to 154 in 2030. This is an increase compared to 2000 when 126 daily operations occurred at night.
- The 2030 operations forecast produced a larger set of DNL noise contours with the number of people exposed to noise levels greater than DNL 65 dB increasing from 3,947 in 2011 to 12,211 people in 2030. This is still significantly fewer than the number of people exposed in 2000 (17,745 people). The number of people within the DNL 70 dB is also projected to increase from 130 in 2011 to 352 people in 2030 but still remaining well below the 1,551 people within the DNL 70 dB in 2000. All of the residences within the forecasted 2030 DNL 65 dB contour are in areas where Massport has implemented its sound insulation program.

A-22 The information in this chapter is very informative and I encourage Massport to continue with detailed analysis in the 2012-2013 EDR. I strongly advise Massport to consider and address the comments on noise and noise related issues.

A-23 The 2012-2013 EDR should provide an overview of the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. The chapter should report on 2012 and 2013 conditions and compare those conditions to those of 2011 for the following:

- Fleet Mix, including Stage II, Recertified (Hushkitted) Stage III, newly manufactured Stage III, and qualifying Stage IV aircraft;
- Nighttime operations;
- Runway utilization (report on aircraft and airline adherence with runway utilization goals);
- Preferential runway advisory system (PRAS) tracking; and
- Flight tracks.

The 2012-2013 EDR should also report on 2012 and 2013 conditions and compare those to 2011 conditions for the following noise indicators:

- Using the Federal Aviation Administration's (FAA) most current version of the Integrated Noise Model (INM), and RealContoursTM and RealProfilesTM, produce an accurate set of Day-Night Sound Level (DNL) noise contours. Adjustments made to account for over-water sound propagation and the propagation of sound to areas of higher terrain will be reported;
- Noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the use of RealContoursTM and RealProfilesTM;
- Cumulative Noise Index (CNI);
- Times-Above for 65, 75, and 85 dBA threshold values/Dwell and Persistence of noise levels;
- Installation and benefits of the new noise monitoring system; and
- Flight track monitoring noise quarterly reports.

A-23 cont.

A-24

The 2012-2013 EDR should also report on noise abatement efforts, results from Boston Logan Airport Noise Study (BLANS) study, and provide a status update on the new noise and operations monitoring system.

Air Quality

The 2011 ESPR provides an overview of airport-related air quality issues in 2011 and efforts to reduce emissions. It also predicts emission levels for 2030. Overall total volatile organic compounds (VOC) emissions were 1,109 kilograms per day (kg/day), or 9 percent higher than 2010 levels, but still follow a long-range (i.e., a period of over 20 years) downward trend decreasing by almost 76 percent since 1990. This one-year increase is primarily due to the increase in landing and takeoff operations (LTOs) when compared to 2010 (176,322 LTOs in 2010 and 184,494 LTOs in 2011). Total emissions of oxides of nitrogen (NOX) were 4,077 kg/day, or 2 percent higher than 2010 levels. In 2011, total NOx emissions at Logan Airport were approximately 29 percent lower than 2000 levels. Also, total NOx emissions in 2011 were 707 tons per year (tpy) lower than Massport's 1999 Air Quality Initiative (AQI) benchmark. This represents an overall decrease of 30 percent in NOx emissions since 1999. Total emissions of carbon monoxide (CO) were 6,919 kg/day, or 3 percent lower than 2010 levels and 53 percent lower than 2000 levels; following the same long-range downward trend as VOCs and NOx. Total emissions of particulate matter (PM10/PM2.5) associated with Logan Airport increased in 2011 by approximately 5 percent to 67 kg/day compared to 2010 levels, but still following a long-range downward trend decreasing by 19 percent since 2005 (2005 is the first year that PM10/PM2.5 emissions were reported). This one-year increase is mostly attributable to the corresponding increase in stationary source use, particularly snow melters in conjunction with the unusually heavy snowfall in early 2011.

A-25

Since 1999, there has been a continuing trend of decreasing nitrogen dioxide (NO2) concentrations at both the Massport and Massachusetts Department of Environmental Protection (MassDEP) monitoring sites located in the vicinity of Logan Airport. In addition, the annual NO2 concentrations at all monitoring locations in 2011 continued to be well within the National Ambient Air Quality Standards (NAAQS) for NO2. The NO2 monitoring program was discontinued in 2012. Massport's Air Quality Monitoring Study is now complete, having collected data on a variety of ambient air pollutants over a two-year period as a means of assessing any air quality changes attributable to the operation of the Centerfield Taxiway which was completed in 2009. The findings from this Study will be submitted to MassDEP in 2013, and reported in the next Logan Airport EDR.

2011 marks the fifth consecutive year in which Massport has voluntarily prepared a greenhouse gas (GHG) emissions inventory for the EDR/ESPR. The 2011 GHG emission inventory was prepared following methodological guidance by the Transportation Research Board's (TRB) Airport Cooperative Research Program (ACRP). The 2011 inventory assigns GHG emissions based on ownership or control (whether it is controlled by Massport, the airlines or other airport tenants, or the general public). Total Logan Airport GHG emissions in 2011 were 5 percent higher than 2010 levels primarily due to the increase in aircraft operations and passenger vehicles accessing the Airport. Massport-related emissions represent only 12 percent of total GHG emissions at the Airport, tenant-based emissions represent approximately 68 percent, electrical consumption represents 14 percent; and passenger vehicle emissions represent 6 percent. This inventory is one of the three GHG emissions inventories Massport prepares annually; however, the other two only comprise stationary sources of GHGs and are filed with MassDEP and the U.S. Environmental Protection Agency (EPA) respectively.

A-26

The 2012-2013 EDR should include an overview of the environmental regulatory framework affecting aircraft emissions, changes in aircraft emissions, and the changes in air quality modeling. The chapter should provide discussion on progress on the national and international levels to decrease air emissions to provide context for this chapter. The chapter will also discuss analysis methodologies and assumptions and report on 2012 and 2013 conditions using the most recent versions of the Emissions Dispersion Modeling System (EDMS) and MOBILE motor vehicle emissions. The 2012-2013 EDR should include:

A-27

- Emissions inventory for carbon monoxide (CO)
- Emissions inventory for oxides of nitrogen (NOx)
- Emissions inventory for volatile organic compounds (VOCs)
- Emissions inventory for particulate matter (PM)
- Nitrogen dioxide (NO2) monitoring
- NOx emissions by airline

A-28

The 2012-2013 EDR should also report on the following air quality initiatives (AQI) for 2012 and 2013:

- Air Quality Initiative Tracking;

- Massport's and Tenant's Alternative Fuel Vehicle Programs; and
- The status of Logan Airport air quality studies undertaken by Massport or others, as available. A-28 cont.

Massport has also committed to include an inventory of greenhouse gas (GHG) emissions from Logan Airport in 2012 and 2013. GHG emissions should be quantified for aircraft, ground service equipment (GSE), motor vehicles and stationary sources using emission factors and methodologies outlined in the MEPA Greenhouse Gas Emissions Policy and Protocol. The results of the 2012 and 2013 GHG emissions inventory should be compared to the 2011 results. A-29

This chapter should also include an update on Massport's efforts to encourage the use of single engine taxiing under safe conditions. A-30

Water Quality/Environmental Compliance

The 2011 ESPR describes Massport's ongoing environmental management activities including National Pollutant Discharge Elimination System (NPDES) compliance, stormwater, fuel spills, activities under the Massachusetts Contingency Plan (MCP), and tank management.

The 2012-2013 EDR should report on the 2012/2013 status of:

- National Pollutant Discharge Elimination System (NPDES) Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility;
- Jet fuel usage and spills;
- Massachusetts Contingency Plan (MCP) Activities;
- Tank management;
- Update on the environmental management plan; and A-31
- Fuel spill prevention.

The chapter should also present a discussion of the following topics:

- Future stormwater management improvements (if any); and
- Future MCP and tank management activities.

Sustainability at Logan Airport

This chapter describes Massport's airport-wide sustainability goals. In October 2000, the Massport Board approved an Authority-wide Environmental Management Policy that articulates Massport's commitment to protect the environment and to implement sustainable design principles. In October 2004, the Massport Sustainability Team produced the *Massachusetts Port Authority Sustainability Plan* (Sustainability Plan). The Environmental Management Policy is incorporated in the Sustainability Plan as Massport's long-term sustainability goal or vision. It also identifies the actions necessary to achieve the goals, the staff members responsible for each sustainability goal, and the timeline for achieving the goals.

A-32 The 2012-2013 EDR should report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review and other commitments and have commenced construction. The status of mitigation commitments made in the Section 61 Findings for the following projects should also be reported:

- West Garage/Central Garage
- International Gateway
- Runway Ends 22R and 33L Runway Safety Area Improvements
- Replacement Terminal A
- Logan Airside Improvements Planning
- Southwest Service Area Redevelopment Program

A-33 This chapter should also update the status of Massport's mitigation commitments and also will identify projects for which mitigation is complete.

Distribution of the 2012-2013 EDR

A-34 Massport should explore opportunities to advance the reporting of information through Massport's website. Massport should strive to collect and analyze the information required for
A-35 the 2012-2013 EDR and report this information in a timely manner. For several recent projects, including the 2011 ESPR, Massport has published bi-lingual meeting and project notices and
A-36 made the services of an interpreter available upon request. Massport should consider continuing these services for the 2012-2013 EDR submittal.

Conclusion

A-37 I have determined that the 2011 ESPR for Logan Airport has adequately complied with MEPA and that Massport must submit a 2012-2013 EDR that responds to the issues raised in comments received. The 2012-2013 EDR must include a copy of this Certificate and a copy of each comment letter received on the 2011 ESPR. In particular, Massport should provide a thorough examination of issues raised regarding individual noise monitoring locations, noise measurement and modeling, noise abatement, and air quality issues.

June 14, 2013
Date

Richard K. Sullivan Jr.

Comments Received:

06/06/2013	Philip Johenning
06/07/2013	Nancy Timmerman
06/07/2013	Stephen Kaiser, PhD
06/07/2013	Darryl Pomicter
06/07/2013	Town of Milton
06/14/2013	The Boston Harbor Association

RKS/ACC/acc

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Copy of the Secretary of the Executive Office of Energy and Environmental Affairs Certificate issued for the Terminal E Modernization Project Environmental Notification Form

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The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

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December 16, 2015

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
ENVIRONMENTAL NOTIFICATION FORM

PROJECT NAME	: Terminal E Modernization
PROJECT MUNICIPALITY	: East Boston
PROJECT WATERSHED	: Boston Harbor
EEA NUMBER	: 15434
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: November 9, 2015

Pursuant to the Massachusetts Environmental Policy Act (M.G. L. c. 30, ss. 61-62I) and Section 11.06 of the MEPA regulations (301 CMR 11.00), I have carefully reviewed the Environmental Notification Form (ENF), comments submitted on it, and have carefully considered whether an EIR is warranted. The project is undergoing MEPA review and requires an ENF pursuant to 301 CMR 11.03(6)(b)(6) because it will be undertaken by a State Agency and consists of the expansion of an existing terminal at Logan Airport by greater than 100,000 sf. The project does not exceed a Mandatory EIR threshold. Mandatory EIR thresholds are established to identify a category of projects, or aspects thereof, for which it is presumed that the environmental impacts warrant additional analysis in an EIR.

Comments identify concerns with the project and its impacts and identify broader concerns associated with airport operations and growth. These include comments from Senator Petruccelli, Representative Madaro, and Councilor LaMattina; Representative Garett J. Bradley; the City of Boston Environment Department; the Town of Hull; the Milton Board of Selectmen; representatives of the Massport Citizens Advisory Committee (CAC); and many residents. I have weighed these concerns against the presumption that the project is not subject to a Mandatory EIR and that Massport will prepare an Environmental Assessment (EA) for review pursuant to the National Environmental Policy Act (NEPA), which will include additional opportunities for public comment.

I have determined that additional information regarding the necessary details of design and development of the Terminal E expansion is warranted to properly assess potential impacts. The Scope for the EIR is narrowly tailored to the project and its specific impacts. It is intended to

augment the federal review process, not duplicate it. The EIR is not intended to address broad concerns associated with airport operations and growth. The venue for addressing cumulative environmental impacts is through the Environmental Status and Planning Reports (ESPR) and Environmental Data Reports (EDR).

Through these reports, Logan Airport is subject to comprehensive and regular MEPA review, including opportunities for public comment. This regular updating and reporting on planning and cumulative impacts is unique among State Agencies. It reflects the challenge and complexity of managing and modernizing Logan Airport within a dense, urban area. It recognizes that the proximity of communities to the Airport warrants an enhanced level of public engagement and a concerted, long-term effort to minimize and mitigate impacts.

I expect that Massport can prepare a Draft EIR that will adequately address the Scope such that I may determine, pursuant to 301 CMR 11.08, that no substantive issues remain to be addressed and allow the DEIR to be reviewed as a Final EIR (FEIR) or as a Response to Comments on the DEIR.

Project Description

The project proposes modernizing Boston-Logan International Airport's John A. Volpe International Terminal (Terminal E) with a 500,000 to 700,000-square foot (sf) addition that corrects facility deficiencies and accommodates current and anticipated passenger volumes. The project includes three gates which previously underwent MEPA review (International Gateway Project, EEA #9791) but were not constructed, and two to four additional aircraft gates, passenger holdrooms, concourse, concessions, and passenger processing areas. The project includes Customs and Border Patrol (CBP) and Federal Inspection Services (FIS) facilities to replace and expand FIS facilities that were originally reviewed under MEPA (Terminal B, Pier A Improvements/Satellite FIS Facility, EEA #12235) but also not constructed. The project also includes a direct pedestrian connection between Terminal E and the Massachusetts Bay Transportation Authority's (MBTA) Blue Line Airport Station.

Terminal E was constructed in 1974 with 12 gates and served 1.4 million annual passengers. In 2014, it served approximately five million passengers. The ENF indicates that the current level of passenger activity routinely causes severe congestion in the terminal and negatively impacts customer service and operations. During peak late afternoon and early evening periods, passengers experience severe congestion and delays at the ticket counters and security screening areas, and there is insufficient seating, concessions, and other support services. The ENF indicates that aircraft must use remote parking facilities at hardstands in the North Cargo Area and passengers are bused to the terminal during peak periods when there are insufficient gates. Massport has clearly demonstrated the need for the project and made a compelling case for the expansion.

The project is proposed in two phases. The first phase could include up to five new gates; part of the concourse extension, including the majority of the additional terminal processing area; roadway and curb improvements; and direct pedestrian connections to the MBTA Blue Line Airport Station. The second phase would primarily consist of the remainder of the concourse area, additional gates, holdrooms, boarding bridges; support spaces such as concessions, mechanical spaces, airline and airport operations spaces; and passenger processing areas. Both

phases include airside modifications to accommodate aircraft maneuvering, taxiing, parking, and docking operational requirements.

The project will displace ground service equipment (GSE), other airside activities, existing surface parking, the cell phone lot, and the gas station which will be relocated within existing airport boundaries.

Environmental Status and Planning Report (ESPR)

The MEPA environmental review process for Logan Airport occurs on two levels: airport-wide and project-specific. The ESPR and EDR provide a "big picture" analysis of the environmental impacts of current and anticipated levels of airport-wide activities (including aircraft operations and passenger activity), and presents comprehensive strategies to avoid, minimize and mitigate impacts. The ESPR is generally updated on a five-year basis; the most recent ESPR for the year 2011 was filed in April 2013. Environmental Data Reports (EDRs) evaluate environmental conditions for the reporting year as compared to the previous year and are filed in the years between ESPRs. The most recent EDR for the year 2014 was filed in October 2015. The ESPR is supplemented by (and ultimately incorporates) the EDRs and the detailed analyses and mitigation commitments that emerge from project-specific reviews. This process provides a comprehensive and continuous review of airport programs, projects, environmental impacts and associated data.

The MEPA regulations (Section 11.06(2)) indicate that during the course of an ENF review I may review any relevant information from any other source to determine whether to require an EIR, and, if so, what to require in the Scope. To provide context for this project-specific review and because many issues raised by commenters relate to airport-wide operations and impacts, this Certificate refers to documents from the Environmental Status and Planning Report (ESPR) process (EEA#3247/5146). Massport indicates that the Terminal E project is consistent with the analysis presented in the Environmental Status and Planning Report (ESPR) and has incorporated that document by reference into the ENF as the framework for analyzing cumulative impacts of, and mitigation for, Logan Airport projects, and considers the regional transportation context.

The 2011 ESPR reported on key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, environmental management, and project mitigation tracking. In addition to the annual report on 2011 conditions, the ESPR evaluated the cumulative impacts of passenger growth and associated ground and aircraft operations looking forward to 2030. The ESPR also presented environmental management plans for addressing areas of environmental concern.

The 2011 ESPR identifies a future phase of the International Gateway Project – Terminal E, which includes three new gates, and assumes it is constructed by 2030. The 2012/2013 EDR also identifies this project and indicates it will be constructed beyond 2022. The 2014 EDR identifies the Terminal E Modernization Project as a stand-alone project. It indicates that it would include an additional two to four gates for a total of five to seven gates and construction could begin in 2018.

Logan Airport and Project Site

The Airport boundary encompasses approximately 2,400 acres in East Boston and Winthrop, including approximately 700 acres underwater in Boston Harbor. The Airport is surrounded on three sides by Boston Harbor and is accessible by two public transit lines and the roadway system. The airfield is comprised of six runways and approximately 15 miles of taxiway. Logan Airport has four passenger terminals, A, B, C, and E, each with its own ticketing, baggage claim, and ground transportation facilities.

Terminal E is located adjacent to the North Cargo Area, closest to the MBTA Blue Line Airport Station. Land uses in the area of the proposed project include UPS aircraft parking and loading area, the airport's Remain Over Night aircraft parking area, the North Cargo Area equipment storage area, a building occupied by United Parcel Service (UPS), the MBTA Blue Line Airport Station, airport roadways, various short-term and cell phone parking lots, and a gas station.

The project site is located within the coastal zone of Massachusetts. The entirety of the project site is comprised of previously disturbed impervious area. It is not located in Priority or Estimated Habitat as mapped by the Division of Fisheries and Wildlife's (DFW) Natural Heritage and Endangered Species Program (NHESP). The project site does not contain wetland resource areas regulated pursuant to the Wetland Protect Act and its implementing regulations (310 CMR 10.00).

The ENF identified the following projects within the vicinity of Terminal E that have been reviewed under MEPA: Terminal A Replacement (EEA#9329), Terminal E Modifications (EEA#9324), Federal Inspection Services (FIS) Facility and West Concourse Project / International Gateway (EEA#9791), and Terminal B, Pier A Improvements/Satellite FIS Facility (EEA#12235).

Permitting and Jurisdiction

The project is undergoing MEPA review and requires an ENF pursuant to 301 CMR 11.03(6)(b)(6) because it will be undertaken by a State Agency and results in the expansion of an existing terminal at Logan Airport by greater than 100,000 sf.

The project requires a Sewer Permit Modification from the Boston Water and Sewer Commission (BWSC) and may require an Industrial User Permit from the Massachusetts Water Resource Authority (MWRA). The project may be subject to Massachusetts Office of Coastal Zone Management (CZM) federal consistency review.

The project requires approval by the Federal Aviation Administration (FAA) for changes to the Airport Layout Plan and, therefore, requires an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA). The project also requires a National Pollutant Discharge Elimination System (NPDES) General Permit for Construction from the U.S. Environmental Protection Agency.

Because the project will be undertaken by a State Agency, MEPA jurisdiction is broad in scope and extends to all aspects of the project that may cause Damage to the Environment, as defined in the MEPA regulations.

Environmental Impacts and Mitigation

The project includes construction of approximately 500,000 to 700,000 sf of new floor area (for a maximum 1,500,000 sf total), and will increase both water consumption and wastewater generation by approximately 25,600 gallons per day (76,800 gpd total). The project will not create new impervious area and will eliminate approximately 60 parking spaces. The ENF indicates that the project will accommodate existing and forecasted passenger levels and operations and, therefore, will not increase passenger enplanements or vehicle trips.

Measures to avoid, minimize and mitigate project impacts include improving high-occupancy vehicle (HOV) access to the airport via a direct pedestrian connection to the MBTA Blue Line Airport Station and reducing air emissions, greenhouse gas (GHG) emissions, and energy consumption by providing better access to gate plug-ins and pre-conditioned air. The ENF also indicates that the building will act as a noise barrier to the adjacent neighborhood and Memorial Stadium Park.

Review of the ENF

The ENF includes a general description of proposed activities, a conceptual plan, and a limited analysis of alternatives. It does not provide a typical level of information necessary to evaluate the potential environmental impacts of the project for the purpose of MEPA review. The ENF does not address why construction projections have changed compared to the ESPR and EDR or how the increase in gates may affect the impact analysis which is based on the 2011 ESPR forecasts. The ENF provides a scope for the NEPA EA that identifies further analysis and data that will be provided to assess potential impacts and measures to avoid, minimize, and mitigate these impacts. As requested by Massport, the ENF was subject to an extended 30-day comment period to provide additional time for public review and comment. C.1

Environmental Justice

Massport provided outreach consistent with the spirit and intent of the enhanced public participation provisions of the EJ Policy. Massport requested and was granted an extension of the comment period to provide additional time to review and comment on the ENF. The meeting notice was published in The Boston Herald, The East Boston Times, and the Winthrop Transcript. It was translated into Spanish and also published in El Mundo. Spanish language translation was provided at the joint MEPA/NEPA meeting held on November 19, 2015. In addition, Massport held additional meetings and presented information regarding the Terminal E Expansion at a number of meetings from September through December. I expect that Massport will employ similar approaches to ensure public review and comment of the EIR. C.2

Massport has also provided enhanced air quality analysis and assessment of cumulative impacts in the ESPR and EDRs that address the spirit and intent of the EJ Policy. The Scope for the EA indicates that it will evaluate potential disproportionate noise and air quality impacts for existing and future build years 2022 and 2030; demonstrate how it will avoid, minimize, and/or mitigate these impacts to the greatest feasible extent; and, ensure that its proposed actions will not unduly burden low income or minority areas. C.3

I have received numerous comment letters regarding environmental justice and concerns that the burden of cumulative noise, air pollution, and traffic impacts associated with growth and increased operations will be borne by neighboring communities, independent of this specific project. The Executive Office of Energy and Environmental Affairs (EEA) Environmental Justice Policy (EJ Policy) was designed to improve protection of low income and communities of color from environmental pollution as well as promote community involvement in planning and environmental decision-making to maintain and/or enhance the environmental quality of their neighborhoods.

Alternatives Analysis

The ENF identified a maximum developable footprint and indicated that all Build Alternatives will be located within previously developed land within the Airport Boundary. It did not identify a Preferred Alternative or compare relative impacts/benefits of alternatives. The ENF indicated that conceptual Build Alternatives will be developed during the NEPA permitting process based on airport industry planning standards, FAA, Customs and Border Patrol, and Transportation Security Administration (TSA) requirements that define various terminal, airside, and landside functions. C.4 The key differences among potential alternatives will relate to the internal and external layout of the building, the ability to efficiently accommodate passengers, and constructability. According to the ENF, all Build Alternatives will include phased development of three gates followed by the development of between two and four additional new gates, additional concourse with supporting facilities, a new direct pedestrian connection to the MBTA's Blue Line Airport Station, reconfiguration of adjacent roadways and short-term parking areas, and reconfiguration of some airside operations. All Build Alternatives will be located within existing paved and developed areas of the airport that are currently used for aviation or aviation-related activities.

The ENF indicates that under the No-Build alternative, passenger and aircraft operations would continue to increase as projected in the 2011 ESPR, but there would be no significant changes to Terminal E interior or exterior facilities. Gate service facilities would be inadequate to efficiently handle the increase in scheduled operations and passengers and arriving aircraft would wait on the apron with engines idling until an aircraft clears a gate or park at a "hardstand" away from the Terminal at a North Cargo Area aircraft parking area and passengers will deplane using mobile stairs and be bused to the terminal. Hardstand operations, aircraft idling, and the use of on-board diesel auxiliary power units (APU) require greater use of energy, including bussing passengers to and from the terminal, and use of the aircraft engines to provide electricity to the cabin during these ground operations. The ENF indicates that the No-Build alternative would result in insufficient passenger processing capacity, long wait times at ticketing and security, and additional congestion at the curb and roadway. Based on these considerations, the No-Build alternative was eliminated.

Comments on the ENF request Massport accommodate more demand at regional airports and evaluate regional project alternatives to the proposed project. I acknowledge that long-term strategies to mitigate Logan's impacts will continue to include an emphasis on diverting travel to regional airports and to rail. Regional transportation will continue to be addressed through the ESPR and EDR, not through this project-specific review. C.5

The 2011 ESPR and 2014 EDR provide a thorough analysis of trends in regional airport activity and identify initiatives and joint efforts to improve the efficiency of the regional transportation system (including regional rail transportation initiatives). The reports identify Massport investments in Hanscom Field and Worcester Regional Airports, consistent with the findings of the 2006 New England Regional Airport System Plan (NERASP) Study. Future ESPRs and EDRs will require Massport to report on Logan's role in the regional transportation system; Massport's efforts to promote the Worcester Regional Airport and Hanscom Field; the status of plans and improvements provided by the regional airport authorities; cooperation with other transportation agencies to promote efficient regional highway and transit operations; and, report on metropolitan and regional rail initiatives and ridership. The reports demonstrate that Massport has continued to emphasize and build on opportunities to strengthen regional transportation.

Climate Change Adaptation and Resiliency Measures

Massport recently completed a Disaster and Infrastructure Resiliency Planning (DIRP) Study and generated a Floodproofing Design Guide which are intended to improve their ability to restore operational capabilities during and after major disruptions, and to adapt and enhance facilities to be more resilient to the effects of extreme weather events. The DIRP Study identified increased storm and sea-level rise as the threats with the highest probability of occurring and impacting Massport operations. The Floodproofing Design Guide also notes that Logan Airport is increasingly susceptible to flooding hazards caused by extreme storms and rising sea levels as a result of climate change.

The ENF does not include information regarding current Federal Emergency Management Agency (FEMA) floodplain mapping. MassDEP comments note that preliminary flood mapping[1] depicts the 100-year flood zone to the west of the project site, near the Airport MBTA Station. Comments from MassDEP and CZM indicate the proximity of the project to the coastal environment may make it susceptible to sea level rise and increased storm intensity and frequency-related impacts. Massport should draw on the DIRP Study and Floodproofing Design Guide to develop mitigation strategies to support the functionality and resiliency of Terminal E in the near and distant future. I encourage Massport to consult with CZM as the project design process progresses. C.6

Greenhouse Gas Emissions

Because I am requiring an EIR, the project is subject to review under the May 2010 MEPA Greenhouse Gas (GHG) Emissions Policy and Protocol ("the Policy"). The ENF indicates that Massport will quantify stationary and mobile source GHG emissions generated by the project and will identify measures to avoid, minimize, or mitigate GHG emissions to determine the applicability of state and federal requirements. I note that mobile sources will only include passenger vehicles and GSE. The ENF indicates that the energy demand of the project may require a new substation and that energy modeling will be used to quantify the GHG emissions for the terminal building. C.7 C.8 C.9

[1] Preliminary Flood Insurance Rate Map, Map Number 25025C0082J, March 16, 2016

Massport has incorporated sustainability into all aspects of its activities through a Sustainability Management Plan as described in the 2014 EDR. Recent Massport accomplishments include compliance with the Leading by Example Executive Order which requires state agencies to procure 15 percent of their electricity from renewable resources; the new Rental Car Center in the Southwest Service Area receiving Logan's first LEED Gold Certification in 2015; and expansion of the Logan Express Bus Service and ongoing support of HOV measures.

Noise

The ENF asserts that the project will not increase the number of aircraft operations when compared to the Future No-Build Alternative. The ENF also indicates that the proposed terminal building will act as a sound barrier to dampen or reflect noise because it will be positioned between the airfield and roadway. These benefits were not analyzed in the ENF. The ENF indicates that the EA will assess the potential for anticipated ground noise impacts resulting from proposed changes to the functioning of the North Cargo Area. The EA will also contain an analysis of the specific sound barrier benefits of the proposed terminal.

Impacts associated with existing operations and noise levels, and potential increases in impacts associated with this project and long-term growth, are a major concern identified in most comment letters. Letters identify a particular concern with nighttime noise and concentrations of flight tracks and increased flight frequency due to the FAA's area navigation (RNAV) procedures. As documented in the ESPR and annual EDR submittals, implementation of several of the RNAV procedures have generated increased noise complaints in some towns surrounding Logan Airport. The procedures themselves have resulted in aircraft at higher altitudes, though in patterns that are concentrated over certain communities. Since 2000, the number of daily aircraft operations and the number of people exposed to the 65 decibel (dB) Day-Night Average Sound Level (DNL) has declined by approximately 27 percent and fifty percent (respectively); reflecting a trend towards fewer overall flights with larger, more efficient, and quieter aircraft. I acknowledge that projected increases in flight operations will increase cumulative noise impacts compared to existing conditions, although they will remain below historic levels. Cumulative impacts will continue to be addressed through the ESPR and EDR, not through project specific review of the Terminal E project. C.10

Air Quality

The ENF indicates that the project will not alter runway use and will not affect the number of anticipated aircraft operations or generate any new vehicle trips. The project may alter airside ground operations in the North Cargo Area, including aircraft taxiing and parking, use of hardstands and busing, and use of supporting ground service equipment (GSE). The ENF indicates that an emissions inventory for the EPA criteria pollutants for airside ground operations (not flight operations) will be conducted for existing and future-year conditions using the recently released FAA Aviation Environmental Design Tool (AEDT). The AEDT will evaluate changes in aircraft ground operations and associated GSE and airside motor vehicle emissions will be assessed using the EPA MOVES model.

Total air quality emissions from all sources at Logan Airport in recent years are significantly less than they were a decade ago. The ENF attributes this downward trend to

Massport's longstanding objective to accommodate the demands of increasing passenger and cargo activity levels with fewer aircraft operations generating fewer emissions. The 2014 EDR demonstrated that total emissions are incrementally increasing. Massport will continue to assess the applicability of emissions reduction measures to the extent practicable and report on air quality in the ESPR and the EDR. C.11

Many comments cite the findings or request additional information on the 2004 Logan Airport Health Study performed by the Massachusetts Department of Public Health (DPH)[2]. The study was published in May 2014 and identified two respiratory outcomes for adults and children living in the high exposure area. In addition to contributions from Logan Airport, the study identified high background levels of air pollutants. The results of this study and have been reported in the annual EDR filings and include actions Massport is taking based on recommendations of the study. Cumulative air quality impacts will continue to be addressed through the ESPR and EDR, not through project specific review of the Terminal E project. C.12

The 2014 EDR indicates that Massport is working with DPH and the East Boston Health Center on implementing the DPH recommendations, including:

- Massport is providing funding to the East Boston Neighborhood Health Center to help expand the efforts of its asthma and chronic obstructive pulmonary disease (COPD) prevention and treatment program in East Boston and launch a program in Winthrop for screening children, providing asthma kits, and home visits;
- Massport entered into an agreement with the Massachusetts League of Community Health Centers for the evaluation and assessment of the Asthma and COPD Prevention and Treatment Program, and engagement of community health centers in the North End, Charlestown, Chelsea, and South Boston. The East Boston Neighborhood Health Center will conduct the same evaluations for the East Boston and Winthrop Community Program.
- Massport entered into an agreement with DPH to expand or establish the Asthma and COPD Prevention and Treatment Program in South Boston, the North End, Chelsea, and Charlestown in collaboration with the Massachusetts General Hospital and the South Boston Neighborhood Health Center, and to conduct training on the Community Health Worker assessments.

Transportation

The ENF asserts that the project will not increase passenger enplanements or vehicle trips to the airport, and therefore, the transportation analysis will be limited to the airport transportation network. The project will require relocation of existing uses in the project area to other airport locations. The ENF indicates that the EA will describe the existing transportation network at the airport, anticipated modifications to the transportation network, and anticipated transportation impacts of the project. According to the ENF, the EA will evaluate potential transportation impacts that may result from the relocated uses. The analysis will evaluate traffic impacts of the preferred alternative and a No-Build Alternative. The analysis will be conducted

[2] The study is available for download at http://www.mass.gov/eohhs/gov/departments/dph/programs/environmental-health/investigations/logan-airport-health-study.html

using the Logan Airport VISSIM model for existing and proposed conditions, with supporting traffic analyses performed using other software (Synchro and QATAR). The analysis will use the VISSIM model results from 2014 (as reported in the 2014 EDR) as the baseline year and the build conditions will be evaluated for 2022 and 2030.

The project includes construction of a direct pedestrian connection between Terminal E and the MBTA Blue Line Airport Station. The EA will include an analysis of the existing public transportation options serving the airport and evaluate the potential impacts the direct connection may have on ridership and operations. C.13

Many comments urge that I require a detailed analysis of ground transportation issues due to the cumulative impacts of landside and air operations at Logan and the identified issues with limited parking capacity. The issues of ground transportation and parking are clearly relevant to any discussion of cumulative impacts, and are an important component of any cumulative air quality analysis, which will continue to be addressed through the ESPR and EDR, not through this project specific review of the Terminal E Expansion. C.14

The ESPR and annual EDR updates include a substantial body of analysis on ground transportation issues. The 2014 EDR indicates that Massport is developing a Long-Term Parking Management Plan intended to address the parking supply, pricing and operations associated with Logan's constrained parking. Strategies to address the parking issue may have implications for design of the Terminal E Modernization project, including curbside access and/or short-term parking areas. C.15

Wastewater & Water Supply

According to the ENF, the project will generate an additional 25,600 gallons per day (gpd) of wastewater flow, for a total of 76,900 gpd. Similarly, the project will consume an additional 25,600 gpd of potable water, for a total of 76,800 gpd. MassDEP has indicated that the project will not require a Sewer Connection Permit from MassDEP. However, under the terms of the new Sewer System Extension and Connection Regulations (314 CMR 12.00), MassDEP requires that sewer authorities with permitted combined sewer overflows (CSOs), including the Boston Water and Sewer Commission (BWSC), require the removal of four gallons of infiltration and inflow (I/I) for each gallon of new wastewater flows generated by any new connection that would generate greater than 15,000 gpd. I refer Massport to comments from BWSC that provide additional guidance on this issue and identify applicable design standards for all new or relocated water mains and sewers. C.16

Comments from MWRA indicate that the project site is served by BWSC combined sewers that discharge to the MWRA's East Boston Branch Sewer. The ENF indicates that there is sufficient capacity in the existing collection system to accommodate the additional flow. I refer Massport to comments from MWRA which request the analysis also consider wet weather flow conditions. C.17

Stormwater

The ENF indicates that the project will not create new impervious area as development of the terminal will occur in an area that is already paved. The Terminal E complex will continue to drain to the North Outfall, which is equipped with end-of-pipe treatment to remove debris and floating oils and grease from stormwater prior to discharge. Comments from CZM indicate that samples from the North Outfall recently exceeded water quality standards for bacteria and recommend that Massport develop a strategy to identify and eliminate illicit sewer connections to address this issue. C.18

According to the ENF, the EA will include a drainage analysis and description of the proposed stormwater management measures and identify the size and location of stormwater management features. The EA will also demonstrate how the project will meet MassDEP Stormwater Management Standards, Logan Airport's stormwater management practices, and the requirements of the NPDES Multi-Sector General Permit under which the airport operates. I refer Massport to comments from BWSC that identify applicable design standards and plan requirements, and provide guidance on discharge of dewatering drainage. C.19

Historic and Archaeological Resources

According to the ENF, the project site does not contain any properties listed in the State or National Registers of Historic Places. The project site contains both an area and a structure that are included in the Massachusetts Historical Commission's (MHC) Inventory of Historic and Archaeological Assets of the Commonwealth (the Inventory). Specifically, the entirety of Logan Airport is identified as an Inventoried Area (MHC ID#BOS.K) and Terminal E is identified as an Inventoried Structure (MHC ID#BOS.63). The ENF contains a commitment to coordinate with MHC to identify potential impacts and avoidance, minimization, and mitigation measures.

Construction Period

The ENF does not identify specific construction period impacts or associated mitigation measures. It indicates that construction period impacts, including noise, air quality, traffic, solid and hazardous waste, and water quality will be evaluated in the EA. It will also describe project phasing and sequencing. Massport participates in MassDEP's Clean Construction Equipment Initiative and requires engine retrofits to reduce exposure to diesel exhaust fumes and particulate emissions. The ENF indicates that demolition activities will comply with MassDEP's Solid Waste and Air Quality control regulations. I refer Massport to comments from MassDEP that provide guidance on asbestos removal and the handling of asphalt, brick, and concrete. The ENF indicates Massport will recycle construction & demolition (C&D) waste. C.20

The ENF indicates that contaminated material will be managed in compliance with the Massachusetts Contingency Plan (MCP) and that a Soil Management Plan may be required to determine whether excavated soils generated through foundation construction can be used onsite or hauled off-site for reuse and/or disposal. The ENF indicates that areas near the site have been regulated under c.21E Release Tracking Number (RTN) 3-10027 (Phase V) and RTN 3-324. MassDEP comments note RTN 3-324 appears to be linked to a site in a different city. Massport should review and confirm the RTN or provide the correct RTN for the site. I refer Massport to MassDEP comments, which provide additional guidance on the excavation, removal and/or C.21 C.22

disposal of contaminated soil, pumping of contaminated groundwater, and/or working on contaminated media. C.22 Cont.

Conclusion

The ENF has provided an overview of the Terminal E Expansion, identified potential environmental impacts, and identified opportunities to avoid, minimize and mitigate impacts; however, the ENF did not provide sufficient information to demonstrate that Massport has sufficiently analyzed alternatives and measures to avoid, minimize and mitigate potential impacts of this specific proposal to the maximum extent practicable.

As noted previously, numerous comments raise concerns about the project, the management of growth at Logan Airport, the environmental and community impacts of this growth, and the mitigation of impacts. I have also received comments that suggest review of the Terminal E Modernization project has been improperly segmented under MEPA from the review of airport operations as a whole.

Massport asserts that international passenger activity is forecast to increase independent of any additional facilities. The 2011 ESPR provides accurate forecasts of passenger demand and aviation activity in 2030 and documents that demand for passenger service is primarily determined by external factors, including economic growth, cost of travel, and demographic shifts. In addition, I note that Massport has been engaged in planning to accommodate growth in international passengers and operations since the 1990's.

The issue of cumulative airport-wide impacts and segmentation is not new to the review of projects at Logan Airport. The ESPR and EDR provide a cumulative analysis of Logan Airport operations, environmental impacts, and mitigation measures. Review of individual projects proceeds within the context of this long-term planning and analysis of cumulative impacts. The record of MEPA review clearly demonstrates that Massport has and continues to identify impacts associated with individual projects within the context of long-term plans and cumulative impacts of Logan Airport. Cumulative impacts and project specific impacts will continue to be assessed on separate tracks; they will complement each other and ensure that projects are not viewed in isolation. C.23

Based on a review of the ENF, consultation with State Agencies and review of comment letters, I am requiring that Massport submit an EIR consisting of the EA and limited additional information identified in the Scope. The DEIR will consist of a project specific review of the Terminal E Modernization project within the context of airport-wide operations and impacts as a whole. The purpose of the DEIR is to:

1. Provide a detailed and comprehensive project description including conceptual design; C.24
2. Identify protect-specific impacts and the project's consistency with Logan planning and annual reporting; C.25
3. Consider how alternative building design and location, within the project site, can minimize impacts and maximize benefits; and, C.26
4. Provide draft Section 61 Findings that identify project-specific mitigation measures. C.27

Through this review, Massport will demonstrate that it has met its obligations under MEPA to avoid, minimize and mitigate impacts of the Terminal E Modernization to the maximum extent feasible.

In recognition of the comment letters that raise concerns with cumulative airport-wide impacts pertaining to traffic and parking, air quality, and noise and, consistent with the MEPA review structure for Logan Airport, I am requiring Massport to respond to comments regarding airport operations and cumulative impacts in subsequent ESPR and/or EDR documents. The next ESPR will analyze calendar year 2016 and will likely be filed in late 2017 or 2018 and the next EDR will analyze calendar year 2015 and will likely be filed in the fall of 2016. C.28

The 2015 EDR Scope includes reporting on noise, air quality, and long-term parking management. C.29 The 2016 ESPR should revise growth projections based on the changes in the Terminal E Modernization Project that occurred subsequent to the 2011 ESPR (if necessary). C.30 It should also should reflect the proposed connection to the Airport Station and identify the anticipated ridership, changes in the HOV mode share, and ground access planning considerations. C.31

SCOPE

General

The ENF included a proposed scope for the Environmental Assessment that will undergo review pursuant to the National Environmental Policy Act (NEPA). It includes a project description and permitting, alternatives, air quality, climate, coastal resources, hazardous materials, solid waste, pollution prevention, historical, architectural, archaeological and cultural resources, land use, natural resources and energy supply, noise and compatible land use, transportation, water resources, and construction impacts. In the interest of harmonizing State and federal review and in recognition of the significant and on-going planning and analysis represented by the ESPR and the EDRs, Massport may submit the EA as the Draft EIR. The EA should be supplemented by addressing the additions and modifications identified in this Scope. If Massport would prefer to tailor the EIR rather than submit the EA, the EIR should consist of the standard MEPA requirements for an EIR (Section 11.07(6)) and address the requirements of the MEPA GHG Emissions Policy and Protocol. C.32

Massport may also choose to coordinate the State and federal review. MEPA comment and review periods may be adjusted to align with NEPA deadlines. Lastly, I note that this certificate applies to the review of the project under MEPA only, and does not restrict the ability of the federal government to act on those aspects of the project subject to NEPA.

Project Description and Permitting

The EIR should identify and describe any changes to the project since the filing of the ENF and provide an update on State, local, and federal permitting. It should include a discussion of permitting requirements and document the project's consistency with regulatory standards. C.33

The EIR should include updated site plans for existing and post-development conditions at a legible scale including curbside improvements and changes to the on-airport roadways. C.34

The EIR should provide an update on consultations with the MBTA regarding the proposed connection to the MBTA Airport Station. The EIR should identify whether a Land Transfer (including easement) from MBTA will be required to construct the pedestrian connection to the MBTA Airport Station. The EIR should include a conceptual design for the proposed connection to the Airport Station and identify anticipated ridership, potential changes in the HOV mode share, and associated ground access planning considerations. C.35

Alternatives Analysis

The EIR should identify the planning metrics, facility requirements, and assumptions used to design the project and to determine the final number and location of gates. It should compare and contrast benefits and potential impacts of alternatives in narrative form and it a tabular format. The EIR should identify the peak hour used to determine gate locations and design passenger hold rooms. C.36 The EIR should identify the number of planes that are currently forced to "hard stand" during peak hours due to lack of available gates to the number of planes. It should identify the number forced to "hard stand" during peak hours under proposed alternatives. C.37 The EIR should include a discussion of the proposed project and alternatives consistency with the long-term growth forecasts contained in the ESPR and EDR. C.38

GHG Emissions and Climate Change Adaptation and Resiliency

The project is in the conceptual design state and, as such, provides meaningful opportunities for reduction GHG emissions associated with the building location, orientation and design as well as incorporation of resiliency and adaptation considerations. The EIR should describe the project's consistency with the DIRP Study and Massport's Floodproofing Design Guide to demonstrate that the project will incorporate proactive site design measures to address potential impacts related to predicted sea level rise. C.39 In addition to Massport assets, I encourage Massport to consult with the MBTA to review existing station vulnerabilities, as operations of the Blue Line and this station are important to support Massport HOV goals. C.40

The EIR should include an analysis of GHG emissions and mitigation measures in accordance with the standard requirements of the MEPA GHG Policy and Protocol. The analysis should include project-related stationary source emissions and mobile source emissions (passenger vehicles and GSE). I refer Massport to comments from DOER and MassDEP which provide additional guidance regarding mitigation measures that should be explored as part of the GHG analysis. C.41 DOER identifies combined heat and power (CHP) as a particularly promising and effective energy efficiency measure that could also support resiliency of the facility. The EIR should include a feasibility analysis of CHP and a roof-mounted solar photovoltaic (PV) system. I encourage Massport to meet with representatives from MEPA and DOER prior to preparation of the GHG analysis. C.42

Noise

The EA will include a noise analysis. The EIR should identify how the sound barrier benefits of the terminal have been maximized through its location and design. The EIR should C.43

identify whether the addition of new gates constructed to current industry standards would affect the fleet mix and, potentially, alter/increase noise and vibration on Logan Airport and within the surrounding community compared to the 2030 forecasts. C.43 Cont.

Air Quality

The EA will include an emissions inventory for the EPA criteria pollutants for airside ground operations for existing and future-year conditions to evaluate changes in aircraft ground operations and associated GSE and airside motor vehicle emissions. C.44 The EIR should quantify the impacts or benefits of providing direct access to plug-in gate operations and decreasing reliance on auxiliary power units, ground support equipment, and busing passengers around the airport. C.45 Massport should consider the potential and relative benefits of alternative building locations on the site and design between the airfield and neighborhoods as it relates to creating a potential barrier to particulate matter and other hazardous air pollutants. C.46

Construction Period

The EA IR should identify construction period impacts, including noise, air quality, traffic, solid and hazardous waste, and water quality and identify avoidance, minimization, and mitigation measures. C.47 It should also describe project phasing and sequencing. C.48

Mitigation/Draft Section 61 Findings

The EIR should include a separate chapter summarizing proposed mitigation measures. This chapter should also include draft Section 61 Findings for each area of impact associated with Massport's Preferred Alternative. The EIR should contain clear commitments to implement these mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation (either funding design and construction or performing actual construction), and a schedule for implementation. C.49 To ensure that all GHG emissions reduction measures adopted by the Proponent in the Preferred Alternative are actually constructed or performed by the Proponent, I require Proponents to provide a self-certification to the MEPA Office indicating that all of the required mitigation measures, or their equivalent, have been completed. The commitment to provide this self-certification in the manner outlined above should be incorporated into the draft Section 61 Findings included in the EIR. C.50

Responses to Comments

The EIR should contain a copy of this Certificate and a copy of each comment letter received on the ENF. Based on the large volume of comment letters received, the comment letters may be provided electronically on a CD. In order to ensure that the issues raised by commenters are addressed, the EIR should include direct responses to these comments to the extent that they are within MEPA jurisdiction. This directive is not intended, and shall not be construed, to enlarge the scope of the EIR beyond what has been expressly identified in this Certificate. The response can refer to future EDRs and/or ESPRs to address issues that are not within the DEIR Scope. C.51 In addition to items noted in the Scope, the response to comments section should address comments from MassDEP pertaining to wastewater, recycling, source reduction and water conservation efforts. C.52 The EIR should also address wet weather capacity, C.53

wastewater flows, and I/I removal requirements as outlined in MWRA and BWSC's comments. C.53 Cont. I recommend that Massport employ an indexed response to comments format, supplemented as appropriate with direct narrative response. C.54

Circulation

In accordance with Section 11.16 of the MEPA Regulations and as modified by this Certificate, Massport should circulate a hard copy of the EIR to each State and City Agency from which the Proponent will seek permits. Massport must circulate a copy of the EIR to all other parties that submitted individual written comments. Per 301 CMR 11.16(5), the Proponent may circulate copies of the EIR to these other parties in CD-ROM format or by directing commenters to a project website address. However, Massport should make available a reasonable number of hard copies to accommodate those without convenient access to a computer and distribute these upon request on a first-come, first-served basis. Massport should send correspondence accompanying the CD-ROM or website address indicating that hard copies are available upon request, noting relevant comment deadlines, and appropriate addresses for submission of comments. A CD-ROM copy of the filing should also be provided to the MEPA Office. A copy of the EIR should be made available for review at the following Libraries: Boston Public Library – Main, Connolly, Orient Heights, Charlestown, and East Boson Branches, Chelsea Public Library, Winthrop Public Library, Revere Public Library, Everett Public Library, Milton Public Library, and Hull Public Library. C.55

December 16, 2015
Date

Matthew A. Beaton

Comments received:

12/07/2015	Massachusetts Department of Environmental Protection – Northeast Regional Office (MassDEP)
12/07/2015	Massachusetts Water Resources Authority (MWRA)
12/07/2015	Madeleine Steczynski
12/07/2015	Jane O'Reilly
12/07/2015	Alexis Daniels
12/07/2015	Chris Marchi (1st letter)
12/07/2015	Jason Burrell
12/07/2015	John Casamassima
12/07/2015	Kannan Thiruvengadam
12/07/2015	Robin Maguire
12/07/2015	Susanna Starrett
12/07/2015	Theresa Turino
12/08/2015	Alfred Pucillo
12/08/2015	Duane Eric Lock
12/08/2015	Jeannie Grieci
12/08/2015	Joanne Donatelli
12/08/2015	Joanne T. Pomodoro

12/08/2015	John Antonellis
12/08/2015	Lisa Rusch
12/08/2015	Lorraine Curry
12/08/2015	Magdalena Ayed
12/08/2015	Mary Elizabeth Nofziger
12/08/2015	Nancy Lagro
12/08/2015	Normairiis Casiano
12/08/2015	Rebecca Lock
12/08/2015	Sandra Downey
12/08/2015	Danielle Dell'Olio
12/08/2015	Allyson and Michael Simons
12/08/2015	Patricia J D'Amore
12/08/2015	Jessica L. Curtis
12/08/2015	Daniel Cano on behalf of the Eagle Hill Civic Association and Jeffries Point Neighborhood Association (dated 12/02/15)
12/08/2015	Dan Bailey
12/08/2015	Matthew Neave
12/08/2015	Salvador Cartagena
12/08/2015	Alexis Pumphrey
12/08/2015	Jeff Lee
12/08/2015	Kelly Rusch
12/08/2015	Christine Passarriello
12/08/2015	Rick Lockney (with attached data)
12/08/2015	Camille MacLean
12/09/2015	Angela Mroz
12/09/2015	Pamela Loring
12/09/2015	Brian Gannon
12/09/2015	Jay Benson
12/09/2015	Peter Chipman
12/09/2015	Kathyrn Leeber
12/09/2015	Carol Taylor
12/09/2015	Rebecca Lynds
12/09/2015	Georges Arnaout
12/09/2015	Lisa Locke
12/09/2015	James Linthwaite
12/09/2015	Mary J. Ryan
12/09/2015	Steve and Chrissy Holt
12/09/2015	Paul Paquin
12/09/2015	Karis L. North
12/09/2015	David and Carissa Juengst
12/09/2015	Caroline Sulick
12/09/2015	Maria Graceffa
12/09/2015	Robyn Riddle
12/09/2015	Elda and Mark Prudden
12/09/2015	Christine Thompson
12/09/2015	Frank J. Ciano, Arlington Logan CAC and Massport CAC Representative
12/09/2015	Senator Petruccelli, Representative Madaro, Councilor LaMattina
12/09/2015	Elke O'Brien

12/09/2015	Jeff Kerr (1st letter)
12/09/2015	Christina Leshock
12/09/2015	Collin Cameron
12/09/2015	Aaron M. Toffler, on behalf of Airport Impact Relief, Incorporated (AIR, Inc.)
12/09/2015	Jason Hibbard
12/09/2015	Gisela Voss and Dan Kernan
12/09/2015	Elizabeth Kay
12/09/2015	Harvey Rowe
12/09/2015	Jill Romano, Wenham Logan CAC Representative
12/09/2015	Leanne Tirabassi
12/09/2015	Myron Kassaraba, Belmont Logan CAC and Massport CAC Representative
12/09/2015	Nancy Plotkin
12/09/2015	Larry A. Butler
12/09/2015	Rowan Curran
12/09/2015	Lois Freedman
12/09/2015	Kathleen Conlon, Milton Board of Selectmen
12/09/2015	Frank Kerr, Hull Neighbors for Quiet Skies
12/09/2015	Jim Roberts
12/09/2015	Tom Hardey
12/09/2015	Donna Goes
12/09/2015	Colleen MacDonald
12/09/2015	Brian Carney
12/09/2015	Billy Avalos
12/09/2015	John Walkey
12/09/2015	Stephan Marin
12/09/2015	Amelia Cardona
12/09/2015	Jeff Karr (2nd Letter)
12/09/2015	Priscilla Beadle
12/09/2015	H. Gerald Zeller
12/09/2015	Arnie Freedman
12/09/2015	Bonita K Koelker
12/09/2015	Mary Ellen Welch
12/09/2015	Marie & James Fraher
12/09/2015	Erica Mattison, Environmental League of MA, Massport CAC Representative
12/09/2015	Lynn Marie Ray
12/09/2015	Dennis Saide
12/09/2015	Vera Schneider
12/09/2015	Neill K. Ray
12/09/2015	Boston Harbor Association
12/09/2015	Nicole Al Rashid
12/09/2015	Ellen M. Tan, Commonwealth Land Trust
12/09/2015	Cindy L. Christiansen, Milton Logan CAC Representative
12/09/2015	Patricia Waddleton
12/09/2015	Evie Rose
12/09/2015	Carey Lam
12/09/2015	Kathy Beitler
12/09/2015	Joe Berkeley
12/09/2015	Eileen M. Boylen

12/09/2015	David Flynn
12/09/2015	Michael Passariello
12/09/2015	Richard Armenia
12/09/2015	James B. Lampke, Town of Hull, Acting Town Manager
12/09/2015	Cindy Borges-Peralta
12/09/2015	Stephen Cooper
12/09/2015	Tina St. Gelais Kelly
12/09/2015	Tara Ten Eyck
12/09/2015	Maria Ticona
12/09/2015	Ira Fleishman
12/09/2015	Andrew Schmidt
12/09/2015	Debbie Ellerin
12/10/2015	Jeeyoon Kim
12/10/2015	Boston Water and Sewer Commission (BWSC)
12/10/2015	George and Diane Nassopoulos
12/10/2015	Betsy Lewenberg
12/10/2015	Representative Garett J. Bradley
12/11/2015	Massachusetts Office of Coastal Zone Management (CZM)
12/11/2015	Chris Marchi, (2nd letter)
12/11/2015	City of Boston – Environmental Department
12/11/2015	Mary Beth Hamwey
12/11/2015	Maureen White
12/11/2015	Jesse Purvis
12/11/2015	John Tyler
12/11/2015	Renee MacLean
12/11/2015	Edward MacLean
12/11/2015	E.F. (45 Grovers Ave.)
12/11/2015	D.P. (402 Meridian St.)
12/11/2015	Daniel Cordon
12/11/2015	Tanya Hahnel
12/11/2015	B.R. (412 Summer St.)
12/11/2015	A.V. (198 Everett St.)
12/11/2015	Gillian B. Anderson
12/12/2015	Elizabeth Stoy
12/15/2015	Department of Energy Resources (DOER)

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Copy of the Secretary of the Executive Office of Energy and Environmental Affairs Certificate issued for the Terminal E Modernization Project Draft Environmental Assessment/Environmental Impact Report

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The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs

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September 16, 2016

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
DRAFT ENVIRONMENTAL IMPACT REPORT

PROJECT NAME	: Terminal E Modernization
PROJECT MUNICIPALITY	: East Boston
PROJECT WATERSHED	: Boston Harbor
EEA NUMBER	: 15434
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: July 20, 2016

As Secretary of Energy and Environmental Affairs, I hereby determine that the Draft Environmental Impact Report (DEIR) submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (MEPA; M.G.L. c.30, ss.61-621) and with its implementing regulations (301 CMR 11.00). Consistent with Section 11.08 (8)(b)(2)(b) of the MEPA regulations, I am requiring the Proponent to file responses to comments on the DEIR and draft Section 61 Findings. The responses to comments and draft Section 61 Findings shall be filed, circulated, and reviewed as a Final Environmental Impact Report (FEIR). C.1

Comments on the DEIR reflect myriad concerns regarding existing airport operations and noise levels and potential increases in impacts associated with long-term growth. I have received comment letters from elected officials, including U.S. Congressman Michael E. Capuano, State Senator Joseph Boncore, State Representative Adrian Madaro, Boston City Councilor Salvatore LaMattina, and Chelsea City Councilor Roy Avellaneda. Comments were also submitted by municipalities, State and regional agencies, environmental advocacy groups, businesses and residents. The issue of cumulative airport-wide impacts, particularly noise and air quality, is not new to the review of projects at Logan Airport. As noted in past Certificates, the EIR is not intended to address broad concerns associated with airport operations and growth. The venue for addressing cumulative environmental impacts is through the Environmental Status and Planning Reports (ESPR) and Environmental Data Reports (EDR). Through these reports, Logan Airport is subject to comprehensive and regular MEPA review, including opportunities for public comment on the cumulative impacts. This regular updating and reporting on planning and cumulative impacts is unique among State Agencies. It reflects the challenge and complexity of

managing and modernizing Logan Airport within a dense, urban area. It recognizes that the proximity of communities to the Airport warrants an enhanced level of public engagement and a concerted, long-term effort to minimize and mitigate impacts.

Subsequent ESPRs and EDRs will update the cumulative impacts of passenger growth and associated ground and aircraft operations based on revised forecasts and update and revise environmental management plans to address impacts. Future submittals will continue to document potential impacts and trends and propose measures to implement the broad goal of maintaining or reducing Logan's overall environmental impacts, even as annual passenger volumes rise in the future. The next ESPR will analyze calendar year 2016 and will likely be filed in 2017 or 2018 and the next EDR will analyze calendar year 2015 and will likely be filed in the fall of 2016. C.2 C.3

Over the past year, Massport has engaged in a concerted outreach effort with elected officials, municipalities and community groups to identify and discuss potential Massport projects, including but not limited to, Terminal E. Massport created the Logan Airport Impact Advisory Group (IAG) to solicit comment and to identify and prioritize projects and programs of significance to the IAG. One project prioritized through this process is the construction of a pedestrian connection between the Massachusetts Bay Transportation Authority (MBTA) Blue Line Airport Station to Terminal E. Massport has incorporated this connection into the Terminal E project. I commend Massport for its outreach efforts which have been beneficial to informing the MEPA process. I encourage Massport to continue a productive dialogue with interested stakeholders, including through the IAG. C.4

Project Description

The project proposes modernizing Boston-Logan International Airport's John A. Volpe International Terminal (Terminal E) with a 560,000-square foot (sf) addition that corrects facility deficiencies and accommodates current and anticipated passenger volumes. The project includes three gates which previously underwent MEPA review (International Gateway Project, EEA #9791) but were not constructed, and four additional aircraft gates, passenger holdrooms, concourse, concessions, and passenger processing areas. The project includes Customs and Border Patrol (CBP) and Federal Inspection Services (FIS) facilities to replace and expand FIS facilities that were originally reviewed under MEPA (Terminal B, Pier A Improvements/Satellite FIS Facility, EEA #12235) but also not constructed. The project includes a direct pedestrian connection between Terminal E and the MBTA Blue Line Airport Station.

Terminal E was constructed in 1974 with 12 gates and served 1.4 million annual passengers. In 2014, it served approximately five million passengers. The DEIR indicates that the current level of passenger activity routinely causes severe congestion in the terminal at peak times, leading to greatly reduced customer service, and inefficient operations in the terminal and gates. According to the DEIR, gate congestion leads to airside delays and inefficiencies on the North Apron. When no gates are available, arriving aircraft and passengers are held on the apron. The DEIR indicates that aircraft must use remote parking facilities at hardstands in the North Cargo Area and passengers are bused to the terminal during peak periods when there are insufficient gates. The DEIR builds upon the information presented in the ENF regarding challenges associated with current operations at Terminal E. Massport has clearly demonstrated the need for the project and made a compelling case for the expansion.

The DEIR provided additional information to clarify and revise project phasing. The project is proposed in two phases. Phase 1 will be constructed from 2018 – 2022 and will include construction of four new gates with associated passenger holdrooms and elevators/escalators to relieve existing deficiencies and accommodate interim growth. A partial new concourse will be constructed to allow for future expansion to a seven-gate facility at full build-out. Phase 1 will not require modifications to roadway realignment. Phase 2 will be built by 2028 and will provide three additional gates and the MBTA connection. The DEIR indicates the project will be fully constructed and operational by 2030. Due to planning and budget constraints, the MBTA pedestrian connection has been shifted from Phase 1 as proposed in the ENF to Phase 2. The DEIR indicates that no other significant changes have occurred since the ENF was filed.

The project will displace ground service equipment (GSE), other airside activities, existing surface parking, the cell phone lot, and the gas station which will be relocated within existing airport boundaries. Relocation of ground facilities that conflict with the new concourse location, including the gas station, will occur in Phase 1.

Environmental Status and Planning Report (ESPR) and Environmental Data Reports (EDRs)

The MEPA environmental review process for Logan Airport occurs on two levels: airport-wide and project-specific. The ESPR and EDR provide a "big picture" analysis of the environmental impacts of current and anticipated levels of airport-wide activities (including aircraft operations and passenger activity), and presents comprehensive strategies to avoid, minimize and mitigate impacts. The ESPR is generally updated on a five-year basis; the most recent ESPR for the year 2011 was filed in April 2013 and it contained updated passenger activity levels and aircraft operations forecasts through 2030. EDRs evaluate environmental conditions for the reporting year as compared to the previous year and are filed in the years between ESPRs. The most recent EDR for the year 2014 was filed in October 2015. The EDR provided a comprehensive cumulative analysis of the effects of all Logan Airport activities based on actual passenger activity and aircraft operation levels in 2014 and presents environmental management plans for addressing environmental impacts. The ESPR is supplemented by (and ultimately incorporates) the EDRs and the detailed analyses and mitigation commitments that emerge from project-specific reviews. This process provides a comprehensive and continuous review of airport programs, projects, environmental impacts and associated data.

The 2015 EDR Scope includes, but is not limited to, reporting on noise, air quality, and long-term parking management. The 2015 EDR and 2016 ESPR should reflect the proposed connection to the Airport Station, provide updates on the planning and design of the connection, and identify the anticipated ridership, changes in the HOV mode share, and ground access planning considerations. C.5

The MEPA regulations (Section 11.06(2)) indicate that during the course of an ENF review I may review any relevant information from any other source to determine whether to require an EIR, and, if so, what to require in the Scope. To provide context for this project-specific review and because many issues raised by commenters relate to airport-wide operations and impacts, this Certificate refers to documents from the ESPR process (EEA#3247/5146).

Logan Airport and Project Site

The Airport boundary encompasses approximately 2,400 acres in East Boston and Winthrop, including approximately 700 acres underwater in Boston Harbor. The Airport is surrounded on three sides by Boston Harbor and is accessible by two public transit lines and the roadway system. The airfield is comprised of six runways and approximately 15 miles of taxiway. Logan Airport has four passenger terminals, A, B, C, and E, each with its own ticketing, baggage claim, and ground transportation facilities.

Terminal E is located adjacent to the North Cargo Area, closest to the MBTA Blue Line Airport Station. Land uses in the area of the proposed project include UPS aircraft parking and loading area, the airport's Remain Over Night aircraft parking area, the North Cargo Area equipment storage area, a building occupied by United Parcel Service (UPS), the MBTA Blue Line Airport Station, airport roadways, various short-term and cell phone parking lots, and a gas station.

The project site is located within the coastal zone of Massachusetts. The entirety of the project site is comprised of previously disturbed impervious area. It is not located in Priority or Estimated Habitat as mapped by the Division of Fisheries and Wildlife's (DFW) Natural Heritage and Endangered Species Program (NHESP). The project site does not contain wetland resource areas regulated pursuant to the Wetland Protect Act and its implementing regulations (310 CMR 10.00).

The ENF identified the following projects within the vicinity of Terminal E that have been reviewed under MEPA: Terminal A Replacement (EEA#9329), Terminal E Modifications (EEA#9324), Federal Inspection Services (FIS) Facility and West Concourse Project / International Gateway (EEA#9791), and Terminal B, Pier A Improvements/Satellite FIS Facility (EEA#12235).

Permitting and Jurisdiction

The project is undergoing MEPA review and required an ENF pursuant to 301 CMR 11.03(6)(b)(6) because it will be undertaken by a State Agency and results in the expansion of an existing terminal at Logan Airport by greater than 100,000 sf.

The project requires a Sewer Permit Modification from the Boston Water and Sewer Commission (BWSC) and may require an Industrial User Permit from the Massachusetts Water Resource Authority (MWRA). The project may be subject to Massachusetts Office of Coastal Zone Management (CZM) federal consistency review.

The project requires approval by the Federal Aviation Administration (FAA) for changes to the Airport Layout Plan and, therefore, requires an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA). The project also requires a National Pollutant Discharge Elimination System (NPDES) General Permit for Construction from the U.S. Environmental Protection Agency.

Because the project will be undertaken by a State Agency, MEPA jurisdiction is broad in scope and extends to all aspects of the project that may cause Damage to the Environment, as defined in the MEPA regulations.

Environmental Impacts and Mitigation

As described in the ENF, the project includes construction of approximately 500,000 to 700,000 sf of new floor area (for a maximum 1,500,000 sf total), and will increase both water consumption and wastewater generation by approximately 25,600 gallons per day (76,800 gpd total). The project will not create new impervious area and will eliminate approximately 60 parking spaces. The DEIR indicates that the project will accommodate existing and forecasted passenger levels and operations and, therefore, will not increase passenger enplanements or vehicle trips.

Measures to avoid, minimize and mitigate project impacts include reducing air emissions, greenhouse gas (GHG) emissions, and energy consumption compared to existing conditions by improving access to gate plug-ins, pre-conditioned air, and reducing busing operations. In addition, the building is designed to act as a noise barrier to the adjacent residential areas and Memorial Stadium Park.

Review of the DEIR

The DEIR has been filed to provide additional information regarding the necessary details of design and development of the Terminal E expansion to support assessment of potential impacts and has been coordinated with the federal NEPA process. In accordance with my Certificate on the ENF, the Environmental Assessment (EA) as required under NEPA formed the basis of the DEIR.[1] This Certificate applies to the review of the project under MEPA only, and does not restrict the ability of the federal government to act on those aspects of the project subject to NEPA. The DEIR included FAA's draft Finding of No Significant Impact (FONSI). The DEIR described the proposed project, identified existing conditions, described potential environmental impacts and mitigation measures, and provided an expanded discussion of alternatives. It included an update on state, local, and federal permitting and provided a discussion of permitting requirements and the project's consistency with regulatory standards. At Massport's request, the comment period was extended by three weeks to September 9, 2016. C.6

The DEIR identified ongoing projects that are currently under construction and are assumed to be completed prior to commencement of construction for the Terminal E Project. It also identified a potential parking garage, which is predicated on the approval of a draft regulatory change by MassDEP to amend the Logan Airport Parking Freeze Regulation (310 CMR 7.30). The DEIR indicates that the potential parking garage will be subject to MEPA review pursuant to 301 CMR (6)(a)(7) because it will be constructed by a State Agency and will include construction of 1,000 or more new parking spaces. This project is conceptual in nature and the DEIR did not provide a schedule or timeline for its design or construction or for initiating MEPA review. I encourage Massport to consult with the MEPA Office prior to preparing an ENF for this project. C.7

[1] The Federal Aviation Administration (FAA) is reviewing the project as an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA).

Environmental Justice Policy

I have received numerous comment letters regarding environmental justice and concerns that the burden of cumulative noise, air pollution, and traffic impacts associated with growth and increased operations will be borne by neighboring communities, independent of this specific project. The Executive Office of Energy and Environmental Affairs (EEA) Environmental Justice Policy (EJ Policy) was designed to improve protection of low income and communities of color from environmental pollution as well as promote community involvement in planning and environmental decision-making to maintain and/or enhance the environmental quality of their neighborhoods. Massport provided outreach consistent with the spirit and intent of the enhanced public participation provisions of the EJ Policy. Massport requested and was granted an extension of the comment period to provide additional time to review and comment on the DEIR. The meeting notice was published in English and Spanish in the Boston Herald and the East Boston Times. Spanish language translation was also provided at a Public Information Meeting held the evening of August 10, 2016 at the Mario Umana Middle School Academy Auditorium in East Boston. I received many comment letters requesting Massport provide a Spanish language version of the Executive Summary provided with the DEIR filing. Massport has indicated it will provide a Spanish translation of the DEIR Executive Summary. I encourage Massport to continue providing translated Executive Summaries with all future MEPA filings. C.8

Alternatives Analysis

The DEIR included an expanded alternatives analysis that identified the planning metrics, facility requirements, and assumptions used to design the project and to determine the final number of gates based on the passenger projections for year 2030. The DEIR provided a gating analysis for forecast passenger activity and aircraft operations levels to determine the number of gates required to accommodate the volumes of passengers and aircraft that will be arriving and departing at Terminal E during the average weekday peak-hours. As described in the DEIR, Massport has limited control over the scheduling of transatlantic flights, which are subject to lengthy flight times and time zone changes that cause arrival and departure peaks to occur within a relatively short time period. The DEIR indicates that peak hour for international departures will be between 9:00 pm to 10:00 pm and the peak hour for international arrivals will be between 6:00 pm and 7:00 pm. According to the DEIR, approximately 1,954 passengers are projected to depart in 2030 during the peak hour (9:00 pm to 10:00 pm) and 1,885 passengers are projected to arrive during the peak hour (6:00 pm to 7:00 pm). Based on this, the gating analysis indicates that Logan Airport will require an additional seven gates for a total of 19 gates to efficiently support international operations.

The DEIR identified the number of planes that are forced to "hard stand" during peak hours due to lack of available gates under existing, future No-Build, and future Build-Conditions. As described in the DEIR, in the summer of 2015, aircraft scheduling demanded 13 gates, one more than the existing twelve gates. Throughout 2015, only 10 of the existing 12 Terminal E gates were available for use as two were decommissioned to allow for construction of the Terminal E Renovation and Enhancements Project. From April to September 2015, facility constraints at Terminal E resulted in 293 gate-delays, which affected approximately 44,000 passengers and 49 ramp busing operations to remote hardstands which affected over 8,200 passengers. As described in the DEIR, aircraft waiting for gates account for 55-percent of total delays at Terminal E, while busing operations to remote hardstands account for 11-percent of

total delays. According to the DEIR, in the proposed (2030) Build-Condition, only two operations will require use of a "hard stand" and busing, whereas under the No-Build, 17 flights (arrival and departure) per day will require busing operations. The DEIR also included a summary of key aircraft gate and passenger terminal area facility program requirements for the proposed project to address current deficiencies and meet the needs for future anticipated aircraft and passenger handling.

The DEIR evaluated the following alternate configurations of the new terminal area and the North Apron:

- Alternative A: Separate Core Terminal – New linear concourse and terminal core, with new separate curb frontage.
- Alternative B: Concourse Extension – Extension from existing concourse extending westward from the Gate 12 area at the west end of Terminal E.
- Alternative C: Satellite Concourse – New portion of the terminal positioned as a separate two-sided concourse structure with underground passageway connecting the new gates to the existing terminal space.
- Alternative D: Extended Core Terminal *(Preferred Alternative)* – New extension of the existing concourse, terminal core, and terminal frontages.

Each alternative included seven new gates consistent with the need identified in the gating analysis. The key differences among the terminal configuration alternatives relate to efficiency of interior operations, frontage on the adjacent roadway, disruption to the existing operations during construction, and cost. With the exception of the ability to buffer ground noise from ground operations, there is little difference in environmental impacts among the alternatives. Alternative D was selected as it provides the greatest passenger processing efficiency, interior space, and noise buffering benefits compared to the other alternatives. Massport also evaluated three alternative roadway configurations based on the preferred terminal configuration. The three roadway alternatives (Bi-Level S-Curves, Single S-Curve, and Northern Loop Ramps) all extend the roadway frontage to facilitate drop-off and pick-up along the new building area, and realign the roadway ramps servicing Terminal E. The DEIR indicates that the roadway configurations have similar environmental impacts since the limit of work is currently fully developed and that all build options will replicate the existing traffic flow patterns. The Preferred Alternative (Single S-Curve) was selected as it provides the best alignment for traffic operations while minimizing the overall footprint.

Comments on the DEIR continue to request that Massport accommodate more demand at regional airports in lieu of or in conjunction with the proposed project. I acknowledge that long-term strategies to mitigate Logan's impacts will continue to include an emphasis on diverting travel to regional airports and to rail. As indicated in the Certificate on the ENF, regional transportation will continue to be addressed through the ESPR and EDR, not through this project specific review. C.9

GHG Emissions

Because I required an EIR, the project is subject to review under the May 2010 MEPA Greenhouse Gas (GHG) Emissions Policy and Protocol ("the Policy"). The DEIR included an analysis of GHG emissions and mitigation measures that is generally in accordance with the standard requirements of the MEPA GHG Policy and Protocol; however, the FEIR must address C.10

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several issues. The DEIR did not address many of the comments and recommendations provided in the DOER ENF comment letter. I refer Massport to DOER's comment letter. In addition, discrepancies exist between the mitigation measures presented in Table 6-1 (Summary of Terminal E Modernization Beneficial Measures), the "Sustainability Features" narrative (Section 6.2.2), the Draft Section 61 Findings (Appendix B), and the information provided in the MEPA Greenhouse Gas Analysis Technical Report (Appendix G). It is unclear which GHG reduction C.11 measures have been committed to by the Proponent and which will continue to be evaluated. For example, many measures included in Table 6-1 which summarizes Massport's commitments to beneficial measures are subsequently referred to (in Section 6.2.2 of the narrative) as measures "to-be considered for their feasibility and applicability" during the preliminary design phase and later design phases. C.12 As indicated below, the Response to Comments must provide a detailed response to address each of the issues identified in DOER's comment letter and draft Section 61 Findings should be revised accordingly. C.13

The Base Case scenario is based on the 8th Edition of the Massachusetts Building Code that includes the International Energy Conservation Code 2012. The eQUEST v.3.64 modeling software was used to perform the GHG analysis. The DEIR indicates that Massport will build the Terminal E project to achieve LEED Silver or higher certification. The DEIR summarized the following design mitigation measures that were modeled in the GHG analysis and proposed for adoption by the Proponent:

- Improved building envelope (wall insulation of U-0.05, roof insulation of U-0.037, improved glazing of U-0.34, and reduced window to wall ration of 25%)
- Improved Air Handling Units (Variable Air Volume with reduced fan power per cfm; dual enthalpy air economizer to maximize benefit of using outdoor air to condition the building; automatic rest of fan static pressure and supply air temperature based on space loading to reduce fan power, cooling energy, and heating energy); C.14
- Efficient water loops with reduced water supply temperature and wider return temperatures to reduce demand on the pumping and fan systems; and
- Reduced interior lighting power density (LPD) of 0.62 W/SF and reduced exterior lighting power of 9.3 kW.

These design measures were not identified in Table 6-1 or specifically identified in the draft Section 61 Findings. They should be incorporated into revised draft Section 61 Findings. The DEIR identifies the several energy conservation measures that were considered and eliminated primarily for concerns regarding constructability, ease of operations and maintenance and cost. Measures that were eliminated include automated reflective interior blinds to reduce solar heat gain, geothermal heat pumps, fan cycling based on occupancy load, and combined heat and power (CHP). C.15 I refer the Proponent to DOER' s comment letter which recommends further evaluation of CHP to address Terminal E's service water loads. C.16 Massport has indicated that conversion of the equipment at Logan's Central Heating and Cooling Plant will be evaluated as the equipment reaches the end of its useful life. I expect that further evaluation of CHP will be evaluated as part of that process and reported in future EDRs and ESPRS. C.17

Massport has committed to evaluate the following energy efficiency measures as project design progresses: dual box minimum, fin tube radiation, energy recovery wheel, dynamic V8 filtration, and implementation of a solar photovoltaic (pv) array. According to the DEIR, these C.18

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measures could increase energy savings by 70% compared to the currently proposed project. C.18 However, the DEIR does not indicate why these mitigation measures cannot be incorporated into the project design at this time nor does it identify the additional analysis that would be required to inform a determination during subsequent design. C.19 In addition, Section 6.2.2 of the DEIR notes that Massport will investigate the feasibility of providing 2.5% of the project's power with on-site renewable energy through the use of Solar PV; and the Greenhouse Gas Analysis Technical Report (Appendix G) indicates that a 300 kW solar PV array may continue to be evaluated for inclusion in the project. As part of this evaluation, Massport should identify the total rooftop area available for a potential solar PV array and perform a financial feasibility analysis. C.20 To date Massport has installed a total of approximately 916 kW of solar PV at Logan and Hanscom airports. The FEIR should identify the basis for delaying a decision regarding installation of a solar PV project on the rooftop of Terminal E or, at a minimum, re-affirm the commitment to C.21 build it as "solar ready" until subsequent design phases.

Stationary source GHG emissions associated with the energy use of the proposed Terminal E expansion are estimated to generate 5,850 tpy of CO_2 in the Base Case Scenario. Through the adoption of energy efficiency measures, the Preferred Alternative will reduce CO_2 emissions associated with the terminal expansion by 685 tpy, for a total of 5,165 tpy, or a 11.7 percent decrease. The GHG analysis also evaluated total net new GHG emissions from aircraft, GSE, airside ground access vehicles, and additional energy demand associated with the Terminal E expansion. The FAA's Aviation Environmental Design Tool (AEDT) and EPA's MOVES and NONROAD models were used to calculate the GHG emissions associated with the operations, including aircraft engines, GSE/auxiliary power units (APUs), and ground access vehicles. Changes to operations are estimated to reduce GHG emissions by an additional 5,371 tpy.

Climate Change Adaptation and Resiliency

The DEIR described the project's consistency with Massport's Disaster and Infrastructure Resiliency Planning (DIRP) Study and Floodproofing Design Guide. Terminal E will be above the projected 2070 coastal flood elevation. The Design Guide establishes Design Flood Elevations (DFEs) that are more conservative than existing building code requirements. The DEIR indicates that the first level of the project and associated utilities and critical equipment is generally located above the DFE. In areas where spaces must be located below the DFE, critical areas will be flood proofed or protected through use of the following measures: watertight shields on doors, windows, and louvers; exterior and interior membranes and sealants; drainage collection systems and sump pumps; early warning devices to monitor water levels; sealing electrical conduits and other utilities; back-flow preventer valves on drainage and sanitary sewer piping; and use of flood openings to equalize hydrostatic pressure. The DEIR notes that Massport has consulted with CZM regarding development of coastal resiliency design measures. Massport will continue consultations with CZM and MBTA and to review existing station vulnerabilities, as operations of the Blue Line and this station are important to support Massport HOV goals. C.22 Updates on this consultation and the design measures that are considered and/or incorporated into the design to improve the MBTA station's coastal resiliency should be provided in the EDR and ESPR documents.

Air Quality

The DEIR included an analysis to determine whether and to what extent the proposed project will increase criteria pollutants. The analysis evaluated changes in emissions from aircraft engines, APUs and GSE, airside vehicles, and airport passenger and employee motor vehicles under the 2030 No-Build and 2030 Build scenarios. The FAA's AEDT was used to evaluate changes in emissions from aircraft ground operations. EPA's MOVES and NONROAD models were used to evaluate changes in emissions from ground support equipment and motor vehicle emissions. Results of the analysis indicate that total emissions of all pollutants will decrease within the project area under future conditions with the proposed project compared to future conditions without the project.

	Carbon Monoxide	Volatile Organic Compounds	Nitrogen Oxides	Sulfur Oxides	Particulate $Matter_{10}$	Particulate $Matter_{2.5}$
2030 No-Build	294 tpy	35 tpy	59 tpy	9 tpy	11 tpy	4 tpy
2030 Build Condition	268 tpy	33 tpy	33 tpy	6 tpy	10 tpy	3 tpy
Percent Change	-9%	-6%	-44%	-33%	-9%	-25%

The DEIR indicates that the reductions are largely due to the availability and use of gate-furnished electricity and air conditioning rather than APUs while parked at hardstands; reduced reliance on GSE to transport passengers, baggage, and cargo; and improved aircraft operational conditions (e.g., less congestion and delay) on the taxiways and aprons. The DEIR indicates that project complies with the applicable emission thresholds contained in the State Implementation Plan (SIP) and will not cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS). The DEIR quantified temporary construction-related impacts and confirmed that construction-related emissions will not exceed applicable emission thresholds.

Total air quality emissions from all sources at Logan Airport in recent years are significantly less than they were a decade ago; however, the 2014 EDR demonstrated that total emissions are increasing incrementally. The overall reduction is associated with industry trends of accommodating the demands of increasing passenger and cargo activity levels with fewer aircraft operations generating fewer emissions. Massport will continue to assess the applicability of emissions reduction measures to the extent practicable and report on air quality in the ESPR C.23 and the EDR.

Noise

The DEIR asserts that the project will not result in any changes to the number and type of aircraft operations when compared to the Future No-Build Alternative. It indicates that demand is driven by economic and market factors; and, therefore, growth at Logan Airport will continue to occur regardless of the Terminal E project. C.24 Cumulative impacts will continue to be addressed through the ESPR and EDR.

The DEIR included a noise evaluation which evaluated project-related ground noise conditions and the ability of the terminal extension to mitigate noise. The noise model also

identified how changes in the use of Terminal E gates and the North Cargo Area will affect ground noise levels. The extension of Terminal E has been designed to provide a noise barrier between the airport and the community. It will result in reduced noise levels at Jeffries Point, East Boston Memorial Park, and most residential areas in East Boston west of the ramp areas between Route 1A and Putnam Street. Specifically, the project will reduce noise from aircraft ground operations near Terminal E by five to 18 dB and from single event maximum noise levels by two to 15 dB in the Jefferies Point neighborhood. It will reduce noise from aircraft ground operations near Terminal E by three to 15 dB and from single event maximum noise levels by 1 to eleven dB in the Bremen Street area south of Putnam Street to Route 1A. The DEIR indicates that the project will not result in a significant noise increase within the Day-Night Average Sound Level (DNL) 65 dB contour.

C.25

I received many letters which identify a particular concern with concentrations of flight tracks and increased flight frequency due to the FAA's area navigation (RNAV) procedures. The primary purpose of the RNAV procedures is to increase safety and operational efficiency. As documented in the ESPR and annual EDR submittals, implementation of several of the RNAV procedures have generated increased noise complaints in some towns surrounding Logan Airport and I have received many comment letters from residents of the Town of Hull on this issue. The procedures themselves have resulted in aircraft at higher altitudes although patterns are concentrated over certain communities. I note that the FAA is implementing the RNAV program nation-wide. This program is separate from and unrelated to the Terminal E Modernization project. Through my review of the ESPR and EDRs, I am aware of The Boston Logan Airport Noise Study (BLANS)[2]; an ongoing and joint effort between the FAA, Massport, and the Logan Airport Citizen Advisory Committee (CAC). The RNAV procedures to Runways 27, 4L, and 33L were subject to review during Phase 3 of the BLANS[3]. The purpose of Phase 3, currently underway, is to identify opportunities to balance the use of Logan's runways and reduce persistent noise over communities. Flight operations are significantly lower than historic levels; however, I acknowledge that projected increases in flight operations will increase cumulative noise impacts compared to existing conditions. As noted previously, the ESPR and EDRs provide a forum and meaningful opportunities for public review of information and analysis related to these issues. I also encourage residents to contact their CAC representatives to identify additional methods to participate in improving the noise environment around Boston-Logan Airport.

C.26

Construction Period

The DEIR provided additional construction phase information (presented below in the Mitigation Measures section) to identify construction period impacts and measures to control construction traffic, air quality, noise, and water quality impacts.

Mitigation/Draft Section 61 Findings

C.27

The DEIR contained a separate chapter on mitigation measures and provided draft Section 61 Findings in an Appendix. It generally describes mitigation measures and contains commitments to mitigation. As noted earlier, additional clarity is necessary regarding those

[2] Information on the Boston Logan Airport Noise Study can be found at http://www.bostonoverflight.com/index.aspx
[3] These environmental documents can be found at http://www.bostonoverflight.com/phase3_documents.aspx

C.27 Cont.

measures that are commitments and those that will be evaluated as project design progresses. This is particularly relevant to the GHG mitigation measures. The Proponent has committed to implement the following measures to avoid, minimize, and mitigate environmental impacts:

Operational Impacts

- The Terminal E expansion has been sited and will be designed to act as a noise barrier to the adjacent East Boston neighborhoods and Memorial Stadium park to the southwest of the North Apron. The new structures will have a minimum height of 45-ft above ground level.
- New gates will have electric power and pre-conditioned air to allow aircraft to plug in at gate rather than be serviced remotely to reduce need for on-board engine/auxiliary power unit operation, thereby reducing aircraft air emissions and GHG emissions.
- New gates will increase ramp efficiency and reduce movements on North Apron and the need to bus passengers between terminal and remote aircraft parking locations, thereby reducing ground transportation related air emissions and mobile source GHG emissions.
- Roadway and curb improvements which will improve vehicle flow and high-occupancy vehicle access.

Sustainable Design Features/Greenhouse Gas Emissions

- Improved building envelope (wall insulation of U-0.05, roof insulation of U-0.037, improved glazing of U-0.34, and reduced window to wall ratio of 25%).
- Improved Air Handling Units.
- Efficient water loops with reduced water supply temperature and wider return temperatures to reduce demand on the pumping and fan systems.
- Reduced interior lighting power density of 0.62 W/SF and reduced exterior lighting power of 9.3 kW.
- The roof design will incorporate materials with a minimum reflectance rating of 0.70 and emittance value of at least 0.75 for a minimum of 75% of the available roof area. Roofing materials will be non-glare to reduce heat island effect.
- Final design will incorporate infrastructure for collection, storage, and handling of recyclable materials.
- The contractor will be required to develop a construction waste management plan that requires diversion or reduction of construction waste by at least 75%.
- Massport will establish a project-specific goal for sourcing materials extracted, harvested, recovered, and or manufactured within New England.
- The project will be designed to achieve energy efficiencies of a minimum of 20% below the MA Energy Code.
- Continued investigation into the feasibility of supplying 2.5% of the project's power with on-site renewable energy systems.
- The project will be developed to accommodate rooftop solar.
- Project will include water conservation devices that reduce water use by 20% below the MA Plumbing Code.
- Project will incorporate occupancy sensors in all indoor areas to reduce electrical demand.

Construction Period

- Work hours will be limited to 7:00 AM to 5:00 PM unless constrained by operational conditions at the Airport.

- Adequate storage areas for construction supplies will be maintained on airport property.
- Soil Management Plan will be developed based on sub-surface investigations to address identification and disposal of contaminated materials.
- Stormwater Pollution Prevention Plan will be developed to keep sediment and contaminants out of the stormwater management system during construction.
- Management Plan for Dewatering will be developed (if required) to address requirements for testing, handling, and treatment prior to discharge of contaminated groundwater.
- Rodent control, inspection, monitoring, and treatment will be carried out before, during, and after completion of all foundation and utilities demolition and construction work. Rodent extermination prior to work will consist of treatment throughout the project area, including building exteriors and interiors and will continue throughout construction.
- Noise control techniques will be used to reduce noise from pile driving by at least 5 A-weighted decibels (dBA) below unmitigated levels through enclosing the point of impact for the pile drive; installation of an impact cushion between the pile drive and the pile; or requiring the application of energy-absorbing material to steel piles.
- Measures to reduce ground transportation impacts from project construction include:
  - Designated truck routes designed to keep construction-related traffic off of residential streets unless they are seeking construction-related access to or from local businesses.
  - Concrete production/batching will occur in existing plants with access to Route 1A or I-90 to reduce on-airport activities and to consolidate truck trips.
  - Construction companies will be encouraged to provide off-Airport parking for their employees and to provide shuttle services from these locations.
- The following measures will address construction phase air quality impacts:
  - Enforcement of construction vehicle anti-idling provisions;
  - Retrofitting diesel construction equipment with diesel oxidation catalysts and/or particulate filters;
  - Fugitive dust will be controlled via wetting or sweeping and all trucks hauling materials from the construction site will be covered.

Responses to Comments

The Response to Comments should contain a copy of this Certificate and a copy of each C.28
comment letter received on the DEIR. Comment letters may be provided electronically on a CD. C.29
As many of the comment letters identify similar concerns, the FEIR may contain a thematic C.30
response to comments to the extent that they are within MEPA jurisdiction. The response can
also refer to future EDRs and/or ESPRs to address issues that are not within the Scope of this C.31
review. This directive is not intended, and shall not be construed, to enlarge the scope beyond C.32
what has been expressly identified in this Certificate. I recommend that Massport employ an
indexed response to comments format, supplemented as appropriate with direct narrative C.33
response.

The response to comments section should address specific comments from DOER and a C.34
revised GHG analysis should be provided, if necessary to provide a meaningful response. The
Response to Comments should clarify GHG reduction measures and to demonstrate that GHG C.35
emissions will be minimized, avoided, and mitigated to the maximum extent practicable. I expect
that the FEIR will provide a comprehensive and thoughtful response to the DOER comment
letter and that Massport will consult with DOER prior to filing the Response to Comments. C.36

Mitigation/Draft Section 61 Findings

The Response to Comments should include revised draft Section 61 Findings which
should include a complete list of all mitigation measures developed through MEPA review of the C.37
project, including but not limited to, measures specifically incorporated into the terminal design
or operational measures to minimize GHG emissions. The Section 61 findings should clarify
which GHG mitigation measures are proposed as mitigation and which will continue to be
evaluated. It should reconcile the data contained in Table 6-1, Sustainability Features narrative in C.38
Section 6.2.2, and the information provided in the GHG Analysis Technical Report (Appendix
G). The revised draft Section 61 Findings should clarify the reduction in GHG emissions
(compared to the base case) that is being committed to as mitigation. The draft Section 61 C.39
Findings should also identify whether each mitigation commitment will be incorporated or
provided as part of Phase 1, Phase 2, or both phases of the project. C.40

To ensure that all GHG emissions reduction measures adopted by the Proponent in the
Preferred Alternative are actually constructed or performed, I require proponents to provide a
self-certification to the MEPA Office. Specifically, Massport must provide a certification to the C.41
MEPA Office signed by an appropriate professional (e.g., engineer, architect, transportation
planner, general contractor) indicating that the all of the mitigation measures proposed in the EIR
have been incorporated into the project. Alternatively, Massport may certify that equivalent
emissions reduction measures that collectively are designed to reduce GHG emissions by the
same percentage as the measures outlined in the EIR, based on the same modeling assumptions, C.42
have been adopted. The certification should be supported by plans that clearly illustrate where
GHG mitigation measures have been incorporated. For those measures that are operational in
nature (i.e. TDM) the Proponent should provide an updated plan identifying the measures, the
schedule for implementation and how progress towards achieving the measures will be obtained. C.43
The commitment to provide this self-certification in the manner outlined above should be
incorporated into the draft Section 61 Findings included in the EIR.

Circulation

In accordance with Section 11.16 of the MEPA Regulations and as modified by this
Certificate, Massport should circulate a hard copy of the FEIR to each State and City Agency C.44
from which the Proponent will seek permits. Massport must circulate a copy of the FEIR to all
other parties that submitted individual written comments. Per 301 CMR 11.16(5), the Proponent
may circulate copies of the FEIR to these other parties in CD-ROM format or by directing C.45
commenters to a project website address. However, Massport should make available a reasonable
number of hard copies to accommodate those without convenient access to a computer and
distribute these upon request on a first-come, first-served basis. Massport should send
correspondence accompanying the CD-ROM or website address indicating that hard copies are C.46
available upon request, noting relevant comment deadlines, and appropriate addresses for
submission of comments. A CD-ROM copy of the filing should also be provided to the MEPA
Office. A copy of the EIR should be made available for review at the following Libraries: Boston
Public Library – Main, Connolly, Orient Heights, Charlestown, and East Boston Branches, C.47
Chelsea Public Library, Winthrop Public Library, Revere Public Library, Everett Public Library,
Milton Public Library, and Hull Public Library.

Conclusion

Based on a review of the DEIR, consultation with State Agencies, and a review of comment letters, I have determined that the DEIR adequately and properly complies with MEPA and its implementing regulations. The Proponent may submit the Response to Comments and draft Section 61 Findings as the FEIR. C.48

September 16, 2016
Date

Matthew A. Beaton

Comments received:

7/28/2016	Greater Boston Convention & Visitors Bureau
8/1/2016	MassEcon
8/1/2016	Murphy, Hesse, Toomey & Lehane, LLP on behalf of the Town of Milton
8/3/2016	Local 22, Construction & General Laborers' Union
8/3/2016	Mary J. Ryan
8/3/2016	Air Impact Relief (AIR) via Aaron Toffler
8/5/2016	American Council of Engineering Compananies of Massachusetts (ACEC/MA)
8/5/2016	Associated Industries of Massachusetts (AIM)
8/10/2016	Conference of Boston Teaching Hospitals
8/11/2016	Boston Financial Services Leadership Council (BFSLC)
8/11/2016	Susanna Starrett
8/12/2016	Massachusetts Business Roundtable
8/14/2016	Magdalena Ayed
8/15/2016	Juan Ramos
8/15/2016	Linda Barber
8/15/2016	Sema Bekiroglu
8/16/2016	Town of Hull, Philip Lemnios, Town Manager
8/16/2016	Edward J. MacLean
8/16/2016	Renee MacLean
8/17/2016	Andrea White
8/17/2016	David Gardner
8/17/2016	Eugene Courier
8/17/2016	Evie Rose
8/17/2016	Herb Zeller
8/17/2016	Hull Neighbors for Quiet Skies
8/17/2016	Ira Fleishman
8/17/2016	Jen Hartnett-Bullen

8/17/2016	Joe Berkeley
8/17/2016	Juliet Floyd
8/17/2016	Karen Delano
8/17/2016	Kathy A. Beitler
8/17/2016	Linda Karoff
8/17/2016	Lisa Borden
8/17/2016	Maria Graceffa
8/17/2016	Mary Schultz
8/17/2016	Michael Doiron
8/17/2016	Michael Parks
8/17/2016	Philip R. Delano
8/17/2016	Richard Monarch
8/17/2016	Robert Stenberg
8/17/2016	Rosanne Bush
8/17/2016	Sallyann Kakas
8/17/2016	Sarah & Harold Chisholm
8/17/2016	Susan Ovans
8/17/2016	Thomas Hardey
8/17/2016	Tim Fox
8/17/2016	Val Woolley
8/18/2016	Betsy Lewenberg
8/18/2016	Jeff Kerr
8/18/2016	Karen Walsh
8/18/2016	Lloyd Emery
8/18/2016	Nancy Curtis
8/18/2016	Robyn Riddle
8/18/2016	Sheila Connor
8/18/2016	Stephen Etkind
8/18/2016	Nicole Dunn
8/18/2016	Patricia Hynes
8/18/2016	Mr. and Mrs. Tomassini
8/18/2016	Pamela Loring
8/18/2016	Canice Thynne
8/18/2016	John Brennan
8/18/2016	James & Barbara Barrow
8/18/2016	Rebecca and Tillmann Hein
8/18/2016	Stephanie B. Shafran
8/18/2016	Diane & George Nassopoulos
8/18/2016	Chris Maher
8/18/2016	Donna Goes
8/18/2016	Liz West
8/18/2016	Mary Devin
8/18/2016	Marjorie E. Wiseman
8/18/2016	Ellen

8/18/2016	Dorothy Tan
8/18/2016	Charleen Tyson
8/19/2016	Searose@comcast.net
8/19/2016	Town of Milton, Board of Selectmen
8/19/2016	Liz Kinkead
8/19/2016	Colleen MacDonald
8/19/2016	A Better City
8/19/2016	Steve West
8/19/2016	Lois Freedman
8/19/2016	Pam Sargent
8/19/2016	Paul Karoff
8/19/2016	Neill K. Ray
8/19/2016	Arlington and Belmont Representatives to the Logan CAC and Massport CAC
8/19/2016	Kathleen T. McCarthy
8/19/2016	William G. McCarthy
8/19/2016	Boston Harbor Now
8/19/2016	Andrew Schmidt
8/19/2016	Alex D. Doucette
8/19/2016	Massachusetts Department of Environmental Protection (MassDEP)
8/20/2016	Robert Banzett
8/22/2016	Association of Independent Colleges and Universities in Massachusetts (AICUM)
8/23/2016	Patricia McKinley
8/23/2016	Maria Argos Barber
8/23/2016	Joshua Acevedo
8/23/2016	Elizabeth Kay
8/25/2016	Elda Prudden
9/6/2016	Tom Carey
9/6/2016	Congressman Michael Capuano
9/7/2016	Greater Boston Chamber of Commerce
9/8/2016	Chris Marchi
9/8/2016	Steve Holt
9/8/2016	Caroline J. Mailhot
9/8/2016	Eneida Figueroa
9/8/2016	Sam Albertson
9/8/2016	Emily Hyman
9/8/2016	Peter I. Dunn
9/8/2016	Mimi L. Callum
9/8/2016	Massachusetts High Technology Council
9/8/2016	Jane O'Reilly
9/9/2016	Roy Avellaneda, Councilor at Large, Chelsea
9/9/2016	Susanna Starrett
9/9/2016	Michael, Allyson, Willa and Miles Simons
9/9/2016	Carlos Rosales
9/9/2016	Margaret Morris

EEA# 15434 DEIR Certificate September 16, 2016

9/9/2016	Kathleen McCauley
9/9/2016	Lindsay Rosenfeld
9/9/2016	John Antonellis
9/9/2016	John Casamassima
9/9/2016	Brian Gannon
9/9/2016	Celeste Ribeiro Myers
9/9/2016	Theresa Teshia Malionek
9/9/2016	Melissa Tyler
9/9/2016	Sandra Nijjar
9/9/2016	Joanne T. Pomodoro
9/9/2016	Air Impact Relief (AIR) via Aaron Toffler
9/9/2016	Alexis Pumphrey
9/9/2016	Maria Eugenia Corbo
9/9/2016	Magdalena Ayed
9/9/2016	Gail Miller
9/9/2016	Daniel Ryan
9/9/2016	Karen Sullivan
9/9/2016	John Walkey
9/9/2016	Edward, Camille & Renee MacLean
9/9/2016	Service Employees International Union (SEIU) 32BJ, District 615
9/9/2016	Alternatives for Community & Environment, Inc. (ACE)
9/9/2016	Judy Gates
9/9/2016	Mary Ellen Welch
9/9/2016	David Aiken
9/9/2016	Kannan Thiru
9/9/2016	Frederick Salvucci
9/9/2016	Neighbors United for a Better East Boston (NUBE)
9/9/2016	Angel C
9/9/2016	Rudi Seitz
9/9/2016	Alfred A. Pucillo
9/9/2016	Lydia Edwards
9/9/2016	Patricia J. D'Amore
9/9/2016	Alexis Daniels
9/9/2016	Tina Kelly
9/9/2016	Barbara McDonough
9/9/2016	Madeleine Steczynski
9/9/2016	Karen Connor
9/9/2016	Regina Marchi
9/9/2016	Roberto Verthelyi
9/9/2016	Vanessa Fazio
9/9/2016	Chrissy Holt
9/9/2016	Liz Nofziger
9/9/2016	Heather Kros
9/9/2016	June Krinsky-Rudder

9/9/2016	Kim Foltz
9/9/2016	Nancy Lee
9/9/2016	Jessica L. Curtis, JD
9/9/2016	Matthew Neave
9/9/2016	Cindy L. Christiansen
9/9/2016	Michael Passariello
9/9/2016	Elizabeth Kay
9/10/2016	Rob Pyles
9/10/2016	Jesse Borthwick
9/10/2016	Steve Passariello
9/10/2016	Carrie Van Horn
9/10/2016	John Tyler
9/10/2016	Kristen D'Avolio
9/10/2016	Craig Belaney
9/10/2016	Cindy M. López
9/10/2016	Laura Macias Grondin
9/10/2016	Sandra Downey
9/10/2016	Christopher A. Zeien
9/10/2016	Carol Doering
9/12/2016	Department of Energy Resources (DOER)
9/13/2016	Anthony M. Majahad
9/13/2016	State Senator Boncore, State Representative Madaro, and City Councilor LaMattina
9/13/2016	Mary Mitchell
9/14/2016	Olena Chuyan
9/14/2016	Julia Howington
9/16/2016	Karen Maddalena
9/16/2016	Boston Transportation Department (BTD)

MAB/PRC/prc

Copy of the Secretary of the Executive Office of Energy and Environmental Affairs Certificate issued for the Terminal E Modernization Project Final Environmental Assessment/Environmental Impact Report

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The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Charles D. Baker
GOVERNOR

Karyn E. Polito
LIEUTENANT GOVERNOR

Matthew A. Beaton
SECRETARY

Tel: (617) 626-1000
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http://www.mass.gov/eea

November 10, 2016

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
FINAL ENVIRONMENTAL IMPACT REPORT

PROJECT NAME	: Terminal E Modernization
PROJECT MUNICIPALITY	: East Boston
PROJECT WATERSHED	: Boston Harbor
EEA NUMBER	: 15434
PROJECT PROPONENT	: Massachusetts Port Authority
DATE NOTICED IN MONITOR	: October 5, 2016

As Secretary of Energy and Environmental Affairs, I hereby determine that the Final Environmental Impact Report (FEIR) submitted on this project **adequately and properly complies** with the Massachusetts Environmental Policy Act (MEPA; M.G.L. c.30, ss.61-62I) and with its implementing regulations (301 CMR 11.00). As noted in my Certificate on the Draft EIR (DEIR) issued September 16, 2016, the DEIR fully responded to the Scope contained in the Certificate on the Environmental Notification Form (ENF) and therefore the scope of the Final EIR (FEIR) was limited to a response to comments and draft Section 61 Findings.

Comments received on the FEIR continue to identify concerns regarding existing airport operations and noise levels and potential increases with long-term growth. I have received comment letters from elected officials (including U.S. Congressman Michael E. Capuano, the Milton Board of Selectmen, and Revere Mayor Brian Arrigo), state agencies, environmental advocacy groups, businesses, and residents. The issue of cumulative airport-wide impacts, particularly noise and air quality, is not new to the review of projects at Logan Airport. As noted in past Certificates, the EIR is not intended to address broad concerns associated with airport operations and growth. The venue for addressing cumulative environmental impacts is through the Environmental Status and Planning Reports (ESPR) and Environmental Data Reports (EDR). Through these reports, Logan Airport is subject to comprehensive and regular MEPA review, including opportunities for public comment on the cumulative impacts. This regular updating and reporting on planning and cumulative impacts is unique among State Agencies. It reflects the challenge and complexity of managing and modernizing Logan Airport within a dense, urban

area. It recognizes that the proximity of communities to the Airport warrants an enhanced level of public engagement and a concerted, long-term effort to minimize and mitigate impacts.

Subsequent ESPRs and EDRs will update the cumulative impacts of passenger growth and associated ground and aircraft operations based on revised forecasts and update and revise environmental management plans to address impacts. Future submittals will continue to document potential impacts and trends and propose measures to implement the broad goal of maintaining or reducing Logan's overall environmental impacts, even as annual passenger volumes rise in the future. The next ESPR will analyze calendar year 2016 and will likely be filed in 2017 or 2018 and the next EDR will analyze calendar year 2015 and will likely be filed in the fall of 2016.

I note many comments identify a particular concern with concentrations of flight tracks due to the Federal Aviation Administration's (FAA) area navigation (RNAV) procedures. The primary purpose of the RNAV procedures is to increase safety and operational efficiency. As documented in the ESPR and annual EDR submittals, implementation of several of the RNAV procedures have generated increased noise complaints in some towns surrounding Logan Airport. The procedures themselves have resulted in aircraft at higher altitudes and concentration of flight patterns over certain communities. I note that the FAA is implementing the RNAV program nation-wide. This program is separate from and unrelated to the Terminal E Modernization project. Nonetheless, I am aware that Massport and the FAA recently signed a Memorandum of Understanding (MOU) to frame a new process for analyzing opportunities to incrementally reduce noise through changes or amendments to Performance Based Navigation, including RNAV procedures. I commend Massport and the FAA for establishing this agreement, which is a unique project between the FAA and an airport operator. Massport has indicated that this process will incorporate community outreach and public input. I expect that updates on this process will be provided in in future ESPRs and EDRs which will provide an additional forum and meaningful opportunities for public review of information related to these issues.

Over the past year, Massport has engaged in a concerted outreach effort with elected officials, municipalities, and community groups to identify and discuss potential Massport projects, including but not limited to, Terminal E. Massport created the Logan Airport Impact Advisory Group (IAG) to solicit comment and to identify and prioritize projects and programs of significance to the IAG. I commend Massport for its outreach efforts and encourage Massport to continue a productive dialogue with interested stakeholders, including through the IAG.

I have received comments that identify concerns with other potential Massport projects, including the potential parking garage identified in the DEIR, which would require an amendment to the Logan Airport Parking Freeze Regulation (310 CMR 7.30). As noted in the DEIR and previous Certificate, the potential parking garage will be subject to MEPA review pursuant to 301 CMR (6)(a)(7) because it will be constructed by a State Agency and will include construction of 1,000 or more new parking spaces. Subsequent MEPA review will include review of potential environmental impacts and development of project-specific impact avoidance, minimization, and mitigation measures.

Project Description

The project proposes modernizing Boston-Logan International Airport's John A. Volpe International Terminal (Terminal E) with a 560,000-square foot (sf) addition that corrects facility deficiencies and accommodates current and anticipated passenger volumes. The project includes three gates which previously underwent MEPA review (International Gateway Project, EEA #9791) but were not constructed, and four additional aircraft gates, passenger holdrooms, concourse, concessions, and passenger processing areas. The project includes Customs and Border Patrol (CBP) and Federal Inspection Services (FIS) facilities to replace and expand FIS facilities that were originally reviewed under MEPA (Terminal B, Pier A Improvements/Satellite FIS Facility, EEA #12235) but also not constructed. The project includes a direct pedestrian connection between Terminal E and the MBTA Blue Line Airport Station.

Terminal E was constructed in 1974 with 12 gates and served 1.4 million annual passengers. In 2014, it served approximately five million passengers. The DEIR indicated that the current level of passenger activity routinely causes severe congestion in the terminal at peak times, leading to greatly reduced customer service, and inefficient operations in the terminal and gates. According to the DEIR, gate congestion leads to airside delays and inefficiencies on the North Apron. When no gates are available, arriving aircraft and passengers are held on the apron. The DEIR indicated that aircraft must use remote parking facilities at hardstands in the North Cargo Area and passengers are bused to the terminal during peak periods when there are insufficient gates. The DEIR built upon the information presented in the ENF regarding challenges associated with current operations at Terminal E. Massport has clearly demonstrated the need for the project and made a compelling case for the expansion.

The project is proposed in two phases. Phase 1 will be constructed from 2018 – 2022 and will include construction of four new gates with associated passenger holdrooms and elevators/escalators to relieve existing deficiencies and accommodate interim growth. A partial new concourse will be constructed to allow for future expansion to a seven-gate facility at full build-out. Phase 1 will not require modifications to roadway realignment. Phase 2 will be built by 2028 and will provide three additional gates and the MBTA connection. The project will be fully constructed and operational by 2030.

The project will displace ground service equipment (GSE), other airside activities, existing surface parking, the cell phone lot, and the gas station which will be relocated within existing airport boundaries. Relocation of ground facilities that conflict with the new concourse location, including the gas station, will occur in Phase 1.

Environmental Status and Planning Report (ESPR) and Environmental Data Reports (EDRs)

The MEPA environmental review process for Logan Airport occurs on two levels: airport-wide and project-specific. The ESPR and EDR provide a "big picture" analysis of the environmental impacts of current and anticipated levels of airport-wide activities (including aircraft operations and passenger activity), and presents comprehensive strategies to avoid, minimize and mitigate impacts. The ESPR is generally updated on a five-year basis; the most recent ESPR for the year 2011 was filed in April 2013 and it contained updated passenger activity levels and aircraft operations forecasts through 2030. EDRs evaluate environmental conditions for the reporting year as compared to the previous year and are filed in the years

between ESPRs. The most recent EDR for the year 2014 was filed in October 2015. The EDR provided a comprehensive cumulative analysis of the effects of all Logan Airport activities based on actual passenger activity and aircraft operation levels in 2014 and presents environmental management plans for addressing environmental impacts. The ESPR is supplemented by (and ultimately incorporates) the EDRs and the detailed analyses and mitigation commitments that emerge from project-specific reviews. This process provides a comprehensive and continuous review of airport programs, projects, environmental impacts and associated data.

The 2015 EDR Scope includes, but is not limited to, reporting on noise, air quality, and long-term parking management. The 2015 EDR and 2016 ESPR should reflect the proposed connection to the Airport Station, provide updates on the planning and design of the connection, and identify the anticipated ridership, changes in the HOV mode share, and ground access planning considerations.

The MEPA regulations (Section 11.06(2)) indicate that during the course of an ENF review I may review any relevant information from any other source to determine whether to require an EIR, and, if so, what to require in the Scope. To provide context for this project-specific review and because many issues raised by commenters relate to airport-wide operations and impacts, this Certificate refers to documents from the ESPR process (EEA#3247/5146).

Logan Airport and Project Site

The Airport boundary encompasses approximately 2,400 acres in East Boston and Winthrop, including approximately 700 acres underwater in Boston Harbor. The Airport is surrounded on three sides by Boston Harbor and is accessible by two public transit lines and the roadway system. The airfield is comprised of six runways and approximately 15 miles of taxiway. Logan Airport has four passenger terminals, A, B, C, and E, each with its own ticketing, baggage claim, and ground transportation facilities.

Terminal E is located adjacent to the North Cargo Area, closest to the MBTA Blue Line Airport Station. Land uses in the area of the proposed project include UPS aircraft parking and loading area, the airport's Remain Over Night aircraft parking area, the North Cargo Area equipment storage area, a building occupied by United Parcel Service (UPS), the MBTA Blue Line Airport Station, airport roadways, various short-term and cell phone parking lots, and a gas station.

The project site is located within the coastal zone of Massachusetts. The entirety of the project site is comprised of previously disturbed impervious area. It is not located in Priority or Estimated Habitat as mapped by the Division of Fisheries and Wildlife's (DFW) Natural Heritage and Endangered Species Program (NHESP). The project site does not contain wetland resource areas regulated pursuant to the Wetland Protect Act and its implementing regulations (310 CMR 10.00).

The ENF identified the following projects within the vicinity of Terminal E that have been reviewed under MEPA: Terminal A Replacement (EEA#9329), Terminal E Modifications (EEA#9324), Federal Inspection Services (FIS) Facility and West Concourse Project / International Gateway (EEA#9791), and Terminal B, Pier A Improvements/Satellite FIS Facility (EEA#12235).

Permitting and Jurisdiction

The project is undergoing MEPA review and required an ENF pursuant to 301 CMR 11.03(6)(b)(6) because it will be undertaken by a State Agency and results in the expansion of an existing terminal at Logan Airport by greater than 100,000 sf.

The project requires a Sewer Permit Modification from the Boston Water and Sewer Commission (BWSC) and may require an Industrial User Permit from the Massachusetts Water Resource Authority (MWRA). The project may be subject to Massachusetts Office of Coastal Zone Management (CZM) federal consistency review.

The project requires approval by the Federal Aviation Administration (FAA) for changes to the Airport Layout Plan and, therefore, requires an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA). The project also requires a National Pollutant Discharge Elimination System (NPDES) General Permit for Construction from the U.S. Environmental Protection Agency.

Because the project will be undertaken by a State Agency, MEPA jurisdiction is broad in scope and extends to all aspects of the project that may cause Damage to the Environment, as defined in the MEPA regulations.

Environmental Impacts and Mitigation

As described in the ENF, the project includes construction of approximately 500,000 to 700,000 sf of new floor area (for a maximum 1,500,000 sf total), and will increase both water consumption and wastewater generation by approximately 25,600 gallons per day (76,800 gpd total). The project will not create new impervious area and will eliminate approximately 60 parking spaces. The DEIR indicated that the project will accommodate existing and forecasted passenger levels and operations and, therefore, will not increase passenger enplanements or vehicle trips.

Measures to avoid, minimize and mitigate project impacts include reducing air emissions, greenhouse gas (GHG) emissions, and energy consumption compared to existing conditions by improving access to gate plug-ins, pre-conditioned air, and reducing busing operations. In addition, the building is designed to act as a noise barrier to the adjacent residential areas and Memorial Stadium Park.

Review of the FEIR

The FEIR was responsive to the scope issued in the Certificate on the DEIR. It included responses to comments filed on the DEIR and revised draft Section 61 Findings that outline Massport's mitigation commitments for the project. The FEIR included an Executive Summary of the DEIR both in English and a translated version in Spanish. The FEIR included the FAA's revised draft Finding of No Significant Impact/Draft Record of Decision (Draft FONSI/DROD) which was updated since the DEIR. This Certificate applies to the MEPA review of the project.

MEPA review cannot and does not restrict the ability of the federal government to act on those aspects of the project subject to the National Environmental Act (NEPA).

The only change to the project since the review of the DEIR is incorporation of additional mitigation measures to reduce GHG emissions (described below). No other changes to project programming, layout, or anticipated environmental impacts are identified. State Agencies did not request additional MEPA review or identify further analysis that would warrant additional MEPA review.

Response to Comments

The Response to Comments contained a copy of the DEIR Certificate and a copy of each comment letters received on the DEIR. A total of 186 comment letters were provided on the DEIR, of which 120 consisted of form letters. The FEIR contained a summary table that identified each commenter, the issues identified in their comment letter, and the corresponding section(s) of the FEIR to assist in locating the response. The FEIR contained both thematic responses to frequent comments and separate responses to individual comments. I commend Massport for providing a comprehensive response to comments and recognize the time and effort that Massport has invested in the preparation of the FEIR.

Responses to individual comments were provided for state agencies, municipalities, elected officials, and key stakeholders. Thematic responses were provided for the following categories: alternatives, cumulative impacts, environmental justice, ground transportation, health effects, induced growth, MEPA process, mitigation, noise, parking, regionalization, resiliency, RNAV departure procedures, and stakeholder outreach. Many of the comments received on the DEIR identify concerns related to existing airport operations and noise levels and potential increases in impacts associated with long-term growth. As noted in past Certificates, the EIR is not intended to address broad concerns associated with airport operations and growth. The venue for addressing cumulative environmental impacts is through the Environmental Status and Planning Reports (ESPR) and Environmental Data Reports (EDR). The Response to Comments refers to future EDRS and/or ESPRs to address these issues which are not within the Scope of this review.

As required in the Scope, the response to comments section of the FEIR provided a direct response to comments from the Department of Energy Resources (DOER) that clarified the GHG reduction measures proposed for the project and included a revised GHG analysis. Based on the revised analysis, the project incorporated two additional and significant mitigation measures: a 25,000 square feet (sf) rooftop solar photovoltaic (PV) system (300 kW) and solar thermal heating of domestic hot water for public restrooms. These two measures will reduce GHG emissions by 363 tons per year (tpy) compared to the proposed as presented in the DEIR. With these additional mitigation measures, the Preferred Alternative will reduce CO_2 emissions associated with the terminal expansion by 1,390 tpy, for a total of 3,818 tpy, or a twenty-seven percent decrease. The FEIR revised the draft Section 61 findings to reflect the revised mitigation measures.

The FEIR also evaluated and quantified the potential GHG reduction associated with the following five mitigation measures: Dual Box Minimum, Fin Tube Radiation, Energy Recovery Wheel, Dynamic V8 Filtration, and additional 50,000 sf of solar PV panels. The incorporation of

these measures would reduce GHG emissions by fifty-percent. Massport has committed to continue evaluating these measures as design progresses. The FEIR also included an analysis of additional wall, roof, and fenestration improvements which indicated they are not effective GHG reduction strategies for the project. It included an evaluation of solar thermal for the concession-area hot water; however this measure remains under deliberation as concession needs are still being developed.

I acknowledge and appreciate the consultation between Massport and DOER which has resulted in the identification and commitment to additional and significant GHG emission reductions.

Mitigation/Draft Section 61 Findings

The FEIR identified measures to avoid, minimize, and mitigate environmental impacts and included draft Section 61 Findings for use by State Agencies. The FEIR clarified that the timing and responsibility for implementation of each measure. The direct connection to the Airport MBTA Blue Line Station, full sound barrier benefits associated with extending the full width of the terminal, and curb improvements will be implemented during the second phase of the project. The other energy reduction and greenhouse gas reduction measures will be implemented in the first phase of the project. Measures to avoid, minimize, and mitigate environmental impacts include:

Operational Impacts

- The Terminal E expansion has been sited and will be designed to act as a noise barrier to the adjacent East Boston neighborhoods and Memorial Stadium park to the southwest of the North Apron. The new structures will have a minimum height of 45-ft above ground level.
- New gates will have electric power and pre-conditioned air to allow aircraft to plug in at gate rather than be serviced remotely to reduce need for on-board engine/auxiliary power unit operation, thereby reducing aircraft air emissions and GHG emissions.
- New gates will increase ramp efficiency and reduce movements on North Apron and the need to bus passengers between terminal and remote aircraft parking locations, thereby reducing ground transportation related air emissions and mobile source GHG emissions.
- Roadway and curb improvements which will improve vehicle flow and high-occupancy vehicle access.
- Construction of a weather-protected pedestrian connector from the Terminal to the MBTA Airport Blue Line Station (proposed as part of Phase 2).

Sustainable Design Features/Greenhouse Gas Emissions

- Project will seek LEED Certification at the Silver level rating or better and meet or exceed the goals of the MA LEED Plus program.
- Improved building envelope (wall insulation of U-0.05, roof insulation of U-0.037, improved glazing of U-0.34, and reduced window to wall ratio of 25%).
- Improved Air Handling Units.
- Efficient water loops with reduced water supply temperature and wider return temperatures to reduce demand on the pumping and fan systems.
- Reduced interior lighting power density of 0.62 W/SF and reduced exterior lighting power of 9.3 kW.

- The roof design will incorporate materials with a minimum reflectance rating of 0.70 and emittance value of at least 0.75 for a minimum of 75% of the available roof area. Roofing materials will be non-glare to reduce heat island effect.
- Final design will incorporate infrastructure for collection, storage, and handling of recyclable materials.
- Massport will establish a project-specific goal for sourcing materials extracted, harvested, recovered, and or manufactured within New England.
- The project will be designed to achieve energy efficiencies of a minimum of 20% below the MA Energy Code.
- The project will reduce operational-related GHG emissions associated with the Project by a minimum of 30%.
- The project will include water conservation devices that reduce water use by 20% below the MA Plumbing Code.
- The project will be built 'solar ready' to accommodate rooftop solar.
- The Terminal E rooftop will include a minimum 25,000 sf of rooftop solar PV (300 kW).
- Solar thermal PV system will be used to provide hot water for the restrooms.
- Project will incorporate occupancy sensors in all indoor areas to reduce electrical demand.
- Continue to evaluate feasibility of the following measures as design progresses: Energy Recovery Wheel, additional rooftop solar PV, Dual Box Minimum, and Dynamic Filtration.
- A self-certification will be provided to the MEPA office upon completion of the project construction signed by an appropriate professional (e.g. civil engineer, traffic engineer, architect, general contractor) indicating that all of the GHG mitigation measures, or equivalent measures that are designed to collectively achieve the proposed stationary source GHG emission reduction committed to in the FEIR, have been incorporated into the project.

Air Quality

- Project will result in a decrease in carbon monoxide (CO) emissions in the area of Terminal E and the associated aircraft apron by approximately 9%, nitrogen oxide (NO_X) emissions by approximately 44%, and sulfur oxides (SO_X) emissions by approximately 33%.
- Project will result in decrease of Volatile Organic Compounds (VOCs) in the project area by approximately 6% and particulate matter (PM_{10} and $PM_{2.5}$) by approximately 9% and 25%, respectively.

Construction Period Impacts

- Development of a construction waste management plan that requires diversion or reduction of construction waste by a minimum of 75%.
- Use of high efficiency space heating/cooling systems in temporary work spaces.
- Work hours will be limited to 7:00 AM to 7:00 PM unless constrained by operational conditions at the Airport. The sound levels from construction activities will employ measures to voluntarily comply with the City of Boston's noise standards.
- Soil Management Plan will be developed based on sub-surface investigations to address identification and disposal of contaminated materials.
- Implement Indoor Air Quality (IAQ) Management Plan during construction.

- Stormwater Pollution Prevention Plan will be developed to keep sediment and contaminants out of the stormwater management system during construction.
- Soil and groundwater management during construction will be conducted in accordance with the appropriate submittals (i.e., Release Abatement Measures, Immediate Response Actions, and/or Safety Management Plans) and subsurface contamination (if encountered) will be remediated in compliance with the Massachusetts Contingency Plan.
- Measures to reduce impacts from the approximately 60 daily truck trips associated with project construction include:
  - Construction-related traffic will be required to use the North Gate using only state and federal highways and the airport roadway network to keep construction-related traffic off of local East Boston roadways.
  - Use of police detail, as necessary, to manage traffic and ensure public safety.
  - Construction companies will be required to provide off-Airport parking for their employees and to provide shuttle services or other HOV service from these locations.
- The following measures will address construction phase air quality impacts:
  - Contractor will comply with MassDEP's Clean Air Construction Initiative regarding installation of emission control devices (such as diesel oxidation catalyst and/or particulate filters) on equipment;
  - Enforcement of construction vehicle anti-idling provisions;
  - Retrofitting diesel construction equipment with diesel oxidation catalysts and/or particulate filters;
  - Fugitive dust will be controlled via wetting or sweeping and all trucks hauling materials from the construction site will be covered.

Conclusion

Based on a review of the FEIR, comment letters, and consultation with State Agencies, I find that the FEIR adequately and properly complies with MEPA and its implementing regulations. Future EDRs and ESPR submittals will continue to document potential impacts and trends and propose measures to implement the broad goal of maintaining or reducing Logan's overall environmental impacts, even as annual passenger volumes rise in the future. Massport and State Agencies should forward copies of the final Section 61 Findings to the MEPA Office for publication in accordance with 301 CMR 11.12.

November 10, 2016
Date

Matthew A. Beaton

Comments received:

10/08/16	David Waite
10/10/16	Sarah James
10/10/16	Peter Houk
10/15/16	Marjorie Smith
10/18/16	Lahra Tillman

10/18/16	Maureen Wing
10/18/16	Reena Freedman
10/18/16	John Vitagliano
10/21/16	David Bowen
10/21/16	Ken Bader
10/23/16	Estella and David Keefer
10/24/16	Carolann Barrett
10/25/16	Shelia Mooney
10/27/16	Luke Preisner
10/28/16	Frederick Salvucci
10/28/16	Mary Ryan
10/31/16	Amelia Kantrovitz
10/31/16	Caslynn Carambelas and Vaishal Patel
10/31/16	Elizabeth Gazda
10/31/16	Juan Carlos Garzon
10/31/16	Stephen Raymond
10/31/16	Scott Johnson
10/31/16	Julie Vail
11/01/16	Sema Bekiroglu
11/01/16	Catherine Stacy
11/01/16	Cady Landa
11/01/16	Dominica Bonanno
11/01/16	Congressman Michael Capuano
11/01/16	Hull Neighbors for Quiet Skies
11/02/16	Tonya Saccardo
11/02/16	Robert Saccardo
11/02/16	Milton Board of Selectmen
11/02/16	Matthew Stachler, M.D., Ph.D.
11/03/16	Barbara L Lawrence
11/03/16	Magdalena Ayed
11/03/16	City of Lynn, Bill Bochnak, Massport CAC & Logan Airport Member
11/03/16	G. Bernadette Cantalupo, 156 Porter St.
11/03/16	William Schneiderman
11/04/16	Gail Miller
11/04/16	Massachusetts Department of Environmental Protection (MassDEP)
11/04/16	Chris Marchi
11/04/16	James Linthwaite
11/04/16	Catherine Stalberg
11/04/16	Mary Ellen Welch (1 of 2)
11/04/16	Mary Ellen Welch (2 of 2)
11/04/16	Department of Energy Resources (DOER)
11/04/16	Vickie Livermore
11/04/16	City of Revere, Mayor Arrigo
11/04/16	AIR Inc., Aaron Toffler
11/04/16	Deborah Hartman
11/04/16	Mimi Callum
11/04/16	Andrea Vilanova
11/04/16	Ann Jansen
11/04/16	John Casamassima
11/04/16	Alyssa Vangeli
11/04/16	Tara Ten Eyck
11/04/16	Boston Harbor Now

11/07/16 28 Form Letters from Residents of the Porter156 Condominium Association
11/07/16 Jesse Borthwick

MAB/PRC/prc

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Copy of the Secretary of the Executive Office of Energy and Environmental Affairs Certificate issued for the Logan Airport Parking Project Environmental Notification Form

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The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Charles D. Baker
GOVERNOR

Karyn E. Polito
LIEUTENANT GOVERNOR

Matthew A. Beaton
SECRETARY

Tel: (617) 626-1000
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http://www.mass.gov/eea

May 5, 2017

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
ENVIRONMENTAL NOTIFICATION FORM

PROJECT NAME	: Logan Airport Parking Project
PROJECT MUNICIPALITY	: Boston
PROJECT WATERSHED	: Boston Harbor
EEA NUMBER	: 15665
PROJECT PROPONENT	: Massachusetts Port Authority (Massport)
DATE NOTICED IN MONITOR	: April 5, 2017

Pursuant to the Massachusetts Environmental Policy Act (MEPA; M.G. L. c. 30, ss. 61-62I) and Section 11.03 of the MEPA regulations (301 CMR 11.00), I have reviewed the Environmental Notification Form (ENF) and hereby determine that this project **requires** the preparation of a Mandatory Environmental Impact Report (EIR).

Project Description

As described in the ENF, the project includes the construction of 5,000 additional commercial parking spaces at the Logan International Airport (the "Airport"). The parking spaces will be located on additional floors within the existing Economy Garage and at a new parking garage in the location of the existing Terminal E surface parking lot. Potential phasing of the project and design of the parking structures is being developed; however, the ENF indicates that all 5,000 additional commercial parking spaces will be operational between 2022 and 2024. The ENF indicates that the parking spaces are intended to accommodate existing and anticipated air passenger demand for parking at the Airport. According to the ENF, the project will reduce

drop-off/pick-up activity at the Airport and will reduce regional air passenger-related vehicle miles traveled (VMT) and associated air emissions.

In addition to the overall air quality benefits, the ENF indicates that Massport is considering additional high occupancy vehicle (HOV) mode improvement measures in conjunction with this project. These include enhancing Logan Express bus service through expanded parking at existing locations and increased frequency of service and expanding the Logan Express service area to new suburban locations and urban/downtown areas based on the success of the Back Bay Logan Express pilot program. The ENF also indicates that Massport is considering purchasing additional Silver Line buses to increase service capacity to the Airport.

Project Background and Context

The number of commercial and employee parking spaces allowed at Logan Airport is regulated by the Massachusetts Department of Environmental Protection (MassDEP) through the Massport/Logan Airport Parking Freeze (310 CMR 7.30), an element of the Massachusetts State Implementation Plan (SIP) under the federal Clean Air Act. The ENF indicates that peak day demand for on-Airport parking has been increasing, resulting in daily demand frequently nearing the Logan Airport Parking Freeze cap. Massport has filed this ENF concurrent with MassDEP's issuance of a draft regulation to amend the Parking Freeze. At Massport's request, the amendment would allow the creation of an additional 5,000 commercial parking spaces at the Airport. The MassDEP public comment period on the proposed regulations will close on May 8th, after this Certificate is issued.

As currently drafted, the regulations would increase the Logan Airport commercial parking freeze limit by 5,000 spaces (from 18,640 to 23,640 spaces) and would increase the total cap to 26,088 commercial and employee parking spaces (comprised of 23,640 commercial spaces and 2,448 employee parking spaces). The draft regulations include a requirement that Massport complete the following studies, each within 24 months of when the final regulations are promulgated, to identify ways to further support alternative transit options to the airport:

1. A study to evaluate the costs, feasibility, and effectiveness of potential measures to improve HOV access to the Airport. The study would consider, among other things, possible improvements to Logan Express bus service and the benefits of adding Silver Line buses with service to the Airport.
2. A study of costs and pricing for different modes of transportation to and from the Airport to identify a pricing structure and the use of revenues so generated to promote the use of HOV modes of transportation by Airport air travelers and visitors. The study will include evaluation of short-term and long-term parking rates and their influence on different modes of Airport transportation.
3. A study of the feasibility and effectiveness of potential operational measures to reduce non-high occupancy vehicle pick-up / drop-off modes of transportation to Logan Airport, including an evaluation of emerging ride-sharing and transportation network company modes.

This Project is contingent upon MassDEP amending the Logan Airport Parking Freeze regulation and EPA approval of an amendment to the SIP. If the regulations are not amended, the

Logan Airport Parking Project cannot proceed. The MassDEP regulatory amendment would provide the larger framework of the Logan Airport Parking Freeze, while project-specific impacts and mitigation measures will be analyzed through the MEPA review process for the Logan Airport Parking Project.

Logan Airport and Project Site

The Airport boundary encompasses approximately 2,400 acres in East Boston and Winthrop, including approximately 700 acres underwater in Boston Harbor. The airfield is comprised of six runways and approximately 15 miles of taxiway. Logan Airport has four passenger terminals, A, B, C, and E, each with its own ticketing, baggage claim, and ground transportation facilities. The Airport is surrounded on three sides by Boston Harbor and is accessible by two public transit lines and the roadway system. The preferred locations for the parking structures are the Economy Garage and the Terminal E surface parking lot. The Economy Garage is located in the northwest portion of the Airport campus at the intersection of Service Road and Prescott Street. It is comprised of two levels and provides over 2,700 spaces. The Terminal E surface parking lot is located within the Airport interior and adjacent to Terminal E.

As described in the ENF, the airport is well-served by public transportation and approximately 30% of travelers accessing the Airport arrive via HOV modes. Specifically, the Airport is served by several Massachusetts Bay Transportation Authority (MBTA) public transit routes, including Blue and Silver Lines for the rapid transit system, commuter ferry service, and local and express bus routes. Specifically, Massport provides free shuttle service between the Blue Line Airport Station and all Airport terminals and subsidizes the Silver Line Logan Airport Route (SL1) by providing free outbound Silver Line trips from the Airport on eight Silver Line buses purchased for this route by Massport. Massport also operates an extensive Logan Express Bus service, serving five locations. The airport is also served by other private express bus service and intercity bus service as part of the range of HOV modes available for ground access.

The Economy Garage and the Terminal E parking lot sites are both located within the coastal zone of Massachusetts. Both locations are comprised of previously disturbed impervious area. They are not located in Priority or Estimated Habitat as mapped by the Division of Fisheries and Wildlife's (DFW) Natural Heritage and Endangered Species Program (NHESP). The parking lot sites do not contain wetland resource areas regulated pursuant to the Wetland Protect Act and its implementing regulations (310 CMR 10.00).

Environmental Impacts and Mitigation

The project includes construction of 5,000 new commercial parking spaces at two locations. The project is located within previously altered impervious area and will not create new impervious area. According to the ENF, the new spaces are intended to accommodate existing and anticipated air passenger demand for parking at the Airport while minimizing pick-up and drop-off activity and decreasing regional air passenger-related VMT and associated vehicle emissions. Specifically, the ENF indicates that the project will reduce carbon dioxide (CO_2), volatile organic compounds (VOC), and oxides of nitrogen (NO_x) emissions by

approximately 25% in 2022 and approximately 20% in 2030 as compared to the future No-Build Alternative.

The ENF indicates that expanded overall HOV capacity will be necessary to maintain the current HOV mode share as total passenger trips increase. In addition to the overall project benefits and HOV related measures proposed as part of the amendment to the Logan Parking Freeze, the ENF indicates that Massport is considering undertaking additional HOV measures in conjunction with the construction of the proposed 5,000 parking spaces. These include: enhancing existing Logan Express scheduled bus service; expanding Logan Express scheduled bus service; exploring Logan Express scheduled bus service in the urban/downtown area; and investing in additional MBTA Silver Line buses. In addition, the parking garages may be designed to be certified in the new "Parksmart" program, which applies Leadership in Energy and Environmental Design (LEED) sustainability strategies to structured parking facilities. The ENF indicates that measures to avoid, minimize, and mitigate project impacts will be further defined in the DEIR.

Jurisdiction and Permitting

The project is undergoing MEPA review and requires preparation of a mandatory EIR pursuant to 301 CMR 11.03(6)(a)(7) because it will be undertaken by a State Agency and will construct greater than 1,000 parking spaces in a single location.

The project may require a Sewer Permit Modification from the Boston Water and Sewer Commission (BWSC). The project may be subject to Massachusetts Office of Coastal Zone Management (CZM) federal consistency review. As indicated above, this project is contingent upon MassDEP amending the Logan Airport Parking Freeze to allow the creation of an additional 5,000 commercial parking spaces at the Airport. Should the draft regulations which propose amending the freeze be promulgated as final, MassDEP will submit the final amended Parking Freeze regulations to the U.S. Environmental Protection Agency (EPA) for approval and incorporation into the SIP.

The project may require approval by the Federal Aviation Administration (FAA), which would trigger review under the National Environmental Policy Act (NEPA).[1] The project also requires a National Pollutant Discharge Elimination System (NPDES) General Permit for Construction from the EPA.

Because the project will be undertaken by a State Agency, MEPA jurisdiction is broad in scope and extends to all aspects of the project that may cause Damage to the Environment, as defined in the MEPA regulations.

[1] The ENF indicates that the level of NEPA review, if required, will depend on the chosen alternative and will be at the discretion of the FAA.

Review of the ENF

The ENF includes a general description of proposed activities, a conceptual discussion of proposed conditions, a brief analysis of alternative locations, and an executive summary of the project in English and in Spanish. The ENF provides a suggested scope for the DEIR that identifies further analysis and data that will be provided to assess potential impacts and measures to avoid, minimize, and mitigate these impacts. The ENF does not provide project plans nor a description of the parking structures and notes that design of the structures is pending MassDEP amending the Parking Freeze. I expect that the DEIR will be a comprehensive and thorough filing that includes project plans for the Preferred Alternative and demonstrates that impacts have been avoided, minimized, and mitigated to the maximum extent feasible. C.1

Comments

MassDEP comments indicate that the draft Parking Freeze Amendment is under review and public comment is ongoing. Their comments identify design recommendations for the parking structures (including installation of electric vehicle (EV) charging stations and designation of preferred parking spaces for alternative fuel vehicles) request Massport implement measures to increase HOV and transit travel modes to the airport, including those identified by Massport in the ENF and providing incentives to increase HOV use.

Comments from industry and labor groups support the project and identify the economic support that the Airport provides to the region, including jobs, tax revenue, and financing for business growth. Other comments emphasize the importance of Massport implementing additional measures to reduce reliance on single occupancy vehicles (SOV), including those identified by Massport in the ENF. In addition, comments request Massport consider: implementing a toll for vehicles entering or exiting the airport to be used for HOV improvement measures, improving silver line (SL1) service (in addition to adding new vehicles), and improving the shuttle connection between the Blue Line and the terminals. The Scope for the DEIR requires additional information regarding project mitigation measures and methods to sustain and increase HOV mode share. C.2

Alternatives Analysis

The ENF indicates that the planning process considered six alternative on-airport locations for the structured parking facilities. All of the sites are paved and developed areas that are currently used for parking or vehicle storage. The ENF indicates that each of the sites are comparable in terms of regional VMT and emissions reductions since regional access routes will not vary as a result of the garage siting.

- Harborside Drive – Structured parking in location of existing vehicle layover space
- Porter Street – Structured parking over existing taxi pool
- North Cargo Area – Expand Economy Garage in the location of existing surface parking and the Massachusetts State Police building
- Southwest Service Area – Structured parking in location of current bus/limousine pool and overflow parking

- Economy Garage (Preferred Alternative) – Additional spaces above existing garage
- Terminal E Surface Lot (Preferred Alternative) – Structured parking in location of existing surface parking lot

According to the ENF, the Preferred Alternative was selected based on input from the East Boston Logan Impact Advisory Group (LIAG). The ENF indicates that Harborside Drive and Porter Street sites were eliminated due to potential wayfinding and operational challenges and the North Cargo Area was eliminated due to the need to relocate the existing uses. The Southwest Service Area was eliminated as it would require construction of a new parking structure and integration of existing uses into the ground floor. The ENF indicates that the No-Build alternative was eliminated as it would result in higher pollutant emissions and roadway congestion due to the higher VMT associated with the drop-off/pick-up mode. The ENF identifies the Economy Garage and Terminal E Surface Lots as the Preferred Alternative. The ENF indicates the Economy Garage location was selected as the Preferred Alternative because the site access is well defined, it does not require significant changes to existing roadway infrastructure, and it is adjacent to compatible land uses and the Terminal E Surface Lot location was selected due to its proximity to Airport terminals, compatibility with adjacent land uses, and location within the Airport interior to minimize impacts to adjacent communities.

Air Quality

The project is anticipated to shift mode share from drop-off/pick-up modes and result in reductions in regional off-Airport VMT compared to the future No-Build scenario. The project will result in CO_2, VOC, and NO_x reductions of 25.8%, 25.5% and 25.6% (respectively) in 2022 and 20.2%, 20.0%, and 20.2% (respectively) in 2030 as compared to the future No-Build scenario.

The analysis assumes that HOV modes can accommodate the proportional growth in passenger levels. The ENF indicates that Massport will continue to strive to maintain the current HOV mode share levels, and expand overall HOV capacity as total passenger trips increase.

The ENF indicates that an updated air quality analysis will be provided in the DEIR.

GHG Emissions and Sustainability

The project is subject to review under the May 5, 2010 MEPA Greenhouse Gas Emissions Policy and Protocol ("the Policy"). The ENF indicates that Massport will quantify stationary and mobile source emissions (passenger vehicles) generated by the project. Massport has indicated that stationary source emissions will only be evaluated if the garage contains conditioned spaces. I refer Massport to DOER's comment letter which identifies a limited number of GHG measures that should be evaluated regardless of whether the garages include conditioned space.

The ENF identified Massport's efforts to maintain and increase HOV modes, including strategies related to pricing (incentives and disincentives), service availability, service quality, marketing, and traveler information. The ENF indicates that the parking garages may be

designed to be certified in the new "Parksmart" program, which applies LEED sustainability strategies to structured parking facilities.

Noise

The ENF indicates that ground noise impacts will not change significantly as the project will not require proposed relocation of or changes to existing land use. The ENF indicates that the proposed vertical addition to the Economy Garage may act as an additional noise barrier to the adjacent neighborhood.

Construction Period Impacts

The ENF indicates that construction period impacts and associated mitigation measures, including noise, air quality, traffic, solid and hazardous waste, and water quality will be evaluated in the DEIR. It will also describe project phasing and sequencing. Massport participates in MassDEP's Clean Construction Equipment Initiative and requires engine retrofits to reduce exposure to diesel exhaust fumes and particulate emissions. The ENF indicates that construction activities will comply with MassDEP Solid Waste and Air Quality control regulations.

SCOPE

General

The ENF included a proposed scope for the DEIR. It includes an executive summary, project description, alternatives analysis, planning and sustainable design, traffic and multi-modal transportation, air quality and GHG, and construction impacts. In addition to the Scope items proposed in the ENF, the Scope for the DEIR should be supplemented by the additions and modifications identified below.

Project Description and Permitting

C.3 The DEIR should include site plans for existing and post-development conditions at a legible scale including the proposed garage structures and any curbside improvements and changes to the on-airport roadways. C.4 The DEIR should provide additional information to address construction sequencing and phasing. C.5 The DEIR should address traffic volumes and crash rates at the Airport. It should include a description of existing and proposed conditions, including on and off-Airport access, on-Airport circulation, and parking. C.6 The project description should address pedestrian and transit connections between the garages and the airport; pedestrian, transit, and vehicular access and egress locations; access and revenue control systems; anticipated rate structures; and identify hybrid, alternative fuel, and EV parking locations. C.7 As requested by MassDEP, it should include an evaluation of incorporating EV charging stations into the parking garages and identify the number and location of proposed stations. It should

C.7 Cont. include a discussion of how the construction and design of the garage could facilitate future expansion of EV charging stations if warranted by demand.

C.8 As indicated above, the draft amended Parking Freeze regulations would require Massport to complete three studies to identify ways to further support alternative transit options to the Airport. The results of these studies can be used to inform and benefit the development of mitigation measures for the Logan Airport Parking Project. The DEIR should clarify the timeframe for completed studies relative to the timeframe for developing specific mitigation measures for the Logan Airport Parking Project which are identified in the ENF. It should identify any commitments that would be contingent on the completion of a study.

C.9 The DEIR should address ground access considerations associated with the parking structures. It should describe site and design constraints for both locations. C.10 It should identify how the Terminal E garage will be designed consistent with the curbside improvements and changes to on-airport runways associated with the Terminal E Modernization Project which will commence construction in 2018. C.11 The DEIR should identify and describe any changes to the project since the filing of the ENF and provide an update on permitting. It should include a discussion of permitting requirements and document the project's consistency with regulatory standards, as appropriate.

Alternatives Analysis

C.12 The DEIR should expand on the initial alternatives analysis and summarize the findings of and the input provided by the community process that guided site selection. The DEIR should identify the number of parking spaces that could be accommodated at each of the alternative locations and describe in more detail why the Southwest Service Area location was eliminated from consideration. C.13 The DEIR should evaluate potential construction phasing and configurations. C.14 It should compare and contrast benefits and potential impacts of alternatives in narrative form and in a tabular format. C.15 The ENF indicates that the project will provide sufficient parking to accommodate approximately five years of peak-day parking demand if growth trends continue at current rates. The DEIR should identify the planning metrics and analysis used to determine the final number of proposed parking spaces (5,000 spaces).

Air Quality

As indicated above, the project is anticipated to shift mode share from drop-off/pick-up modes and result in reductions in regional off-Airport VMT compared to the future No-Build scenario. The project will result in CO_2, VOC, and NO_x reductions of 25.8%, 25.5% and 25.6% (respectively) in 2022 and 20.2%, 20.0%, and 20.2% (respectively) in 2030 as compared to the future No-Build scenario. As noted in the ENF, although there has been a long-term trend of decreasing emissions since 1990, airport-wide emissions of VOCs and NO_x are predicted to increase slightly from 2010 to 2030. The ENF indicates that a portion of this increase may be attributed to anticipated increases in air passenger activity levels and associated rise in regional and on-Airport VMT.

The air quality analysis provided in the ENF is predicated on maintaining an approximately 30% HOV mode share and proportional growth in demand for HOV. The DEIR should demonstrate that the HOV programs and any proposed HOV improvement measures will C.16 provide the capacity to meet demand associated with growth. Massport has made significant investments in programs to maintain and increase HOV modes and has been recognized as one of the top-ranking airports in terms of HOV/transit mode share. I note the 2015 Environmental Data Report (EDR) indicated that Massport's current ground access goal is to attain a 35.2% HOV mode share when annual air passenger levels reach 37.5 million. The ENF indicates that passenger levels are approaching this level with over 36 million passengers in 2016. To support Massport's investments and extend their benefits, the DEIR should include an evaluation of measures to support HOV use and extend the associated air quality benefits of the program and identify to what extent these measures will contribute towards attaining the future mode share goal.

These additional measures include: increasing the frequency of transit services, C.17 expansion of transit services, parking supply, and pricing; and implementation of tolls or charges that can be used to improve HOV measures. I note improvements to reduce idling time of HOV modes (i.e. Logan Express, Blue Line Airport Shuttle, and SL1 Silver Line) will also provide air quality benefits. I refer Massport to comment letters which recommend additional measures to improve HOV and reduce VMT. I note monitoring and reporting on the progress towards achieving the goals and success of the mitigation program can be addressed in the Long-Term C.18 Parking Management Plan and future Environmental Status and Planning Reports (ESPRs) and Environmental Data Reports (EDRs) (EEA#3247/5146).

The DEIR should identify and analyze localized on-Airport, community ground access, and air quality conditions at each of the proposed locations. The updated air quality analysis for existing and future year conditions should evaluate the changes in transportation and air quality emissions. The air quality analysis provided in the ENF should be revised to reflect the proposed C.19 construction phasing and timeframe to identify when the air quality benefits associated with reduced VMT will be realized.

GHG Emissions and Sustainability

The DEIR should include an analysis of GHG emissions and mitigation measures in accordance with the standard requirements of the MEPA GHG Policy and Protocol. The analysis C.20 should include project-related stationary source emissions (exterior/interior parking structure lighting, ventilation, etc.) and mobile source emissions (passenger vehicles). The DEIR should present an evaluation of mitigation measures as outlined in the comments from the Department C.21 of Energy Resources (DOER) as appropriate based on whether the parking structures will contain conditioned spaces. I note that DOER's comments also identify mitigation measures that should be explored absent conditioned space, including but not limited to reduced lighting power densities (LPD) for interior and exterior lighting, parking structure ventilation, and solar photovoltaic (PV) installations. At a minimum, I expect the DEIR will present an evaluation of C.22 the feasibility and impact of these measures. This evaluation can be performed as separate calculations in lieu of energy modeling.

The DEIR should include an evaluation of rooftop or carport solar PV. It should include a cost analysis to determine the financial feasibility of solar (including potential payback periods) and propose an installation that can be supported by the maximum available roof area (excluding areas dedicated for mechanical equipment) on both parking structures. The DEIR should include the assumed panel efficiency, estimate the electrical output of the system, and estimate annual C.23 GHG reductions due to the use of renewable energy instead of electricity or natural gas. The analysis should include a narrative and data to support the Proponent's adoption (or dismissal) of solar PV systems.

The GHG analysis should include an evaluation of the potential GHG emissions of the project's mobile emissions sources using the EPA MOVES emissions model. The DEIR should use data gathered as part of the air quality analysis to determine mobile emissions for Existing Conditions, and the future No-Build, Build, and Build with Mitigation Conditions. The Build C.24 with Mitigation Conditions should incorporate measures and associated reductions identified in the Air Quality section above that will support HOV use and extend the associated air quality benefits of the program.

The DEIR should provide emission tables that compare base case emissions in tons per year (tpy) with the Preferred Alternative showing the anticipated reduction in tpy and percentage C.25 by emissions source (direct, indirect and transportation). If the garages include conditioned space, information should be provided for each building in a format similar to the example table C.26 provided in DOER's comment letter.

The project is in the conceptual design stage and, as such, provides meaningful opportunities for incorporation of sustainability measures. The DEIR should describe the project's consistency with Massport's Floodproofing Design Guide to demonstrate that the project will incorporate measures into the structure and site design to address potential impacts C.27 related to predicted sea level rise.

Noise

The ENF indicates that constructing additional levels on the Economy Garage can serve as an additional noise barrier to the adjacent neighborhood. The DEIR should identify how the sound barrier benefits of the taller garage have been maximized through its design. This C.28 evaluation should account for the expanded Terminal E building.

Construction Period Impacts

The DEIR should identify construction period impacts, including noise, air quality, C.29 traffic, solid and hazardous waste, and water quality, and identify avoidance, minimization, and mitigation measures. The DEIR should describe the project phasing and sequencing and address C.30 how construction will occur to avoid impacting the existing constrained parking supply. It should address construction phasing and whether construction will occur simultaneously with the C.31 Terminal E project.

Mitigation and Draft Section 61 Findings

The DEIR should include a separate chapter summarizing proposed mitigation measures. C.32
This chapter should also include draft Section 61 Findings for each area of impact associated
with Massport's Preferred Alternative. The DEIR should contain clear commitments to
implement these mitigation measures, estimate the individual costs of each proposed measure, C.33
identify the parties responsible for implementation (either funding design and construction or
performing actual construction), and a schedule for implementation. To ensure that all GHG
emissions reduction measures adopted by the Proponent in the Preferred Alternative are actually
constructed or performed by the Proponent, I require Proponents to provide a self-certification to
the MEPA Office indicating that all of the required mitigation measures, or their equivalent, have C.34
been completed. The commitment to provide this self-certification in the manner outlined above
should be incorporated into the draft Section 61 Findings included in the DEIR.

Response to Comments

The DEIR should contain a copy of this Certificate and a copy of each comment letter C.35
received on the ENF. In order to ensure that the issues raised by commenters are addressed, the
DEIR should include direct responses to these comments to the extent that they are within
MEPA jurisdiction. This directive is not intended, and shall not be construed, to enlarge the C.36
scope of the EIR beyond what has been expressly identified in this Certificate. The response can
refer to future EDRs and/or ESPRs to address issues that are not within the DEIR Scope. I
recommend that Massport employ an indexed response to comments format, supplemented as C.37
appropriate with direct narrative response.

Circulation

In accordance with Section 11.16 of the MEPA Regulations and as modified by this
Certificate, Massport should circulate a hard copy of the DEIR to each State and City Agency C.38
from which the Proponent will seek permits. Massport must circulate a copy of the DEIR to all
other parties that submitted individual written comments. Per 301 CMR 11.16(5), the Proponent C.39
may circulate copies of the DEIR to these other parties in CD-ROM format or by directing
commenters to a project website address. However, Massport should make available a reasonable
number of hard copies to accommodate those without convenient access to a computer and
distribute these upon request on a first-come, first-served basis. Massport should send C.40
correspondence accompanying the CD-ROM or website address indicating that hard copies are
available upon request, noting relevant comment deadlines, and appropriate addresses for
submission of comments. A CD-ROM copy of the filing should also be provided to the MEPA
Office. A copy of the EIR should be made available for review at the following Libraries: Boston C.41
Public Library – Main, Orient Heights, and East Boson Branches, Chelsea Public Library, C.42
Winthrop Public Library, and Revere Public Library.

May 5, 2017
Date

Matthew A. Beaton

Comments received:

4/13/2017	Matthew Barison
4/14/2017	Massachusetts Competitive Partnership (MACP)
4/21/2017	Associated Industries of MA (AIM)
4/18/2017	South Shore Chamber of Commerce
4/21/2017	Association of Independent Colleges and Universities in Massachusetts (AICUM)
4/24/2017	Bill Schmidt, Vice Chairman, Winthrop Board of Health
4/21/2017	Boston Water and Sewer Commission (BWSC)
4/20/2017	Local 22 Construction & General Laborers' Union
4/25/2017	Patricia J. D'Amore
4/25/2017	John Vitagliano
4/25/2017	Frederick Salvucci
4/25/2017	Metropolitan Area Planning Council (MAPC)
4/25/2017	Massachusetts High Technology Council (MAHT)
4/25/2017	Wig Zamore (1 of 4)
4/25/2017	Wig Zamore (2 of 4)
4/25/2017	Wig Zamore (3 of 4)
4/25/2017	Wig Zamore (4 of 4)
4/27/2017	Boston Financial Services Leadership Council
4/27/2017	Department of Energy Resources (DOER)
5/5/2017	Massachusetts Department of Environmental Protection (MassDEP)

MAB/PRC/prc

Copy of the Secretary of the Executive Office of Energy and Environmental Affairs Certificate issued for the Logan Airport Parking Project Draft Environmental Impact Report

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The Commonwealth of Massachusetts

Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

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August 2, 2019

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
DRAFT ENVIRONMENTAL IMPACT REPORT

PROJECT NAME	: Logan Airport Parking Project
PROJECT MUNICIPALITY	: Boston
PROJECT WATERSHED	: Boston Harbor
EEA NUMBER	: 15665
PROJECT PROPONENT	: Massachusetts Port Authority (Massport)
DATE NOTICED IN MONITOR	: June 10, 2019

Pursuant to the Massachusetts Environmental Policy Act (MEPA; M.G.L. c. 30, ss. 61-62I) and Section 11.08 of the MEPA Regulations (301 CMR 11.00), I have reviewed the Draft Environmental Impact Report (DEIR) and hereby determine that it **adequately and properly complies** with MEPA and its implementing regulations. The Massachusetts Port Authority (Massport) must prepare and submit for review a Final Environmental Impact Report (FEIR) in accordance with the Scope provided in this Certificate. The Scope is intended to ensure consistency with other planning documents and ongoing studies and is primarily limited to air quality, greenhouse gas emissions, construction period impacts, responses to comments, and revisions to mitigation measures and draft Section 61 Findings.

As described below, the amended Parking Freeze regulations require Massport to complete three studies to identify ways to further support alternative transit options to and from the Airport. The results of these studies will inform Massport's long-range planning efforts to reduce air passenger-related vehicle miles traveled (VMT) and associated air emissions which will extend the associated air quality benefits of this project. I encourage Massport to amend the 2017 Environmental Status and Planning Report (ESPR), submitted to the MEPA office for

publication in the August 7, 2019 *Environmental Monitor*, to include the completed studies and a summary of their findings. It should also describe how the results have informed Massport's long-range efforts to address VMT and air quality impacts of different ground access modes to/from the Airport and identify recommendations or findings that Massport has already implemented. The completed studies and information identified above should also be provided in the FEIR to support review of these measures.

Project Description

As described in the DEIR, the project includes the phased construction of 5,000 additional commercial parking spaces at the Logan International Airport (the "Airport"). The project will construct a structured parking garage with 2,000 parking spaces in the location of the existing Terminal E surface parking lot followed by the addition of 3,000 new spaces at the Economy Garage through expansion of the existing facility. The Terminal E Garage will open in 2022 and the Economy Garage expansion will open by the end of 2025. The parking spaces are intended to accommodate existing and anticipated air passenger demand for parking at the Airport. According to the DEIR, the project will reduce drop-off/pick-up activity at the Airport and will reduce regional air passenger-related vehicle miles traveled (VMT) and associated air emissions.

In addition to the overall air quality benefits, the DEIR indicated that Massport is implementing additional high occupancy vehicle (HOV) mode improvement measures in conjunction with this project. These include enhancing Logan Express bus service through expanded parking at existing locations and increased frequency of service and expanding the Logan Express service area to new suburban locations and urban/downtown areas based on the success of the Back Bay Logan Express pilot program. The DEIR also indicated that Massport has committed to purchase additional Silver Line buses to increase service capacity to the Airport. As described in the DEIR, Massport is also planning to centralize transportation network company (TNC) (e.g. Uber, Lyft, etc.) operations (i.e. drop-offs and pick-ups) on the ground floor of the Central Garage complex to reduce congestion outside the terminals. Massport is also evaluating mechanism to decrease the number of TNC drivers that leave the Airport without a passenger (i.e., deadhead trips).

Project Background and Context

The number of commercial and employee parking spaces allowed at Logan Airport is regulated by the Massachusetts Department of Environmental Protection (MassDEP) through the Massport/Logan Airport Parking Freeze (310 CMR 7.30), an element of the Massachusetts State Implementation Plan (SIP) under the federal Clean Air Act. As previously described in the Environmental Notification Form (ENF), peak day demand for on-Airport parking was increasing, resulting in daily demand frequently nearing the Logan Airport Parking Freeze cap. Massport worked with MassDEP on an amendment to the Parking Freeze. The ENF was filed concurrent with MassDEP's issuance of a draft regulation to amend the Parking Freeze to allow the creation of an additional 5,000 commercial parking spaces at the Airport. After the Certificate on the ENF was issued, MassDEP approved the requested parking increase and issued the amended regulation on June 30, 2017. The EPA issued a proposed rule approving the

revision of the SIP and incorporating the amended Parking Freeze on March 6, 2018, and the rule went into effect on April 5, 2018. The MassDEP regulations provide the larger framework of the Logan Airport Parking Freeze, while project-specific impacts and mitigation measures will be analyzed through the MEPA review process for the Logan Airport Parking Project.

The approved regulations increased the Logan Airport commercial parking freeze limit by 5,000 spaces (from 18,640 to 23,640 spaces) and increased the total cap to 26,088 commercial and employee parking spaces (comprised of 23,640 commercial spaces and 2,448 employee parking spaces). The regulations (310 CMR 7.30(8)) require that Massport complete the following studies, each within 24 months of June 30, 2017, to identify ways to further support alternative transit options to the airport:

1. A study to evaluate the costs, feasibility, and effectiveness of potential measures to improve HOV access to the Airport. The study should consider, among other things, possible improvements to Logan Express bus service and the benefits of adding Silver Line buses with service to the Airport.
2. A study of costs and pricing for different modes of transportation to and from the Airport to identify a pricing structure and the use of revenues so generated to promote the use of HOV modes of transportation by Airport air travelers and visitors. The study will include evaluation of short-term and long-term parking rates and their influence on different modes of Airport transportation.
3. A study of the feasibility and effectiveness of potential operational measures to reduce non-high occupancy vehicle pick-up/drop-off modes of transportation to Logan Airport, including an evaluation of emerging ride-sharing and transportation network company modes.

Supplemental information from Massport clarified that the three studies will be completed by September 30, 2019.

Logan Airport and Project Site

The Airport boundary encompasses approximately 2,400 acres in East Boston and Winthrop, including approximately 700 acres underwater in Boston Harbor. The airfield is comprised of six runways and approximately 15 miles of taxiway. Logan Airport has four passenger terminals, A, B, C, and E, each with its own ticketing, baggage claim, and ground transportation facilities. The Airport is surrounded on three sides by Boston Harbor and is accessible by two public transit lines and the roadway system. The preferred locations for the parking structures are the Economy Garage and the Terminal E surface parking lot. The Economy Garage is located in the northwest portion of the Airport campus at the intersection of Service Road and Prescott Street. It is comprised of two levels and provides over 2,700 spaces. The Economy Garage has an existing rooftop solar photovoltaic (PV) system on its top level which will be relocated or replaced on the top level of the garage following construction. The Terminal E surface parking lot is located within the Airport interior and adjacent to Terminal E.

The Airport is served by several Massachusetts Bay Transportation Authority (MBTA) public transit routes, including Blue and Silver Lines for the rapid transit system, commuter ferry

service, and local and express bus routes. Specifically, Massport provides free shuttle service between the Blue Line Airport Station and all Airport terminals and subsidizes the Silver Line Logan Airport Route (SL1) by providing free outbound Silver Line trips from the Airport on eight Silver Line buses purchased for this route by Massport. Massport also operates an extensive Logan Express Bus service, serving five locations. The airport is also served by other private express bus service and intercity bus service as part of the range of HOV modes available for ground access.

The Economy Garage and the Terminal E parking lot sites are both located within the coastal zone of Massachusetts. Both locations are comprised of previously disturbed impervious area. They are not located in Priority or Estimated Habitat as mapped by the Division of Fisheries and Wildlife's (DFW) Natural Heritage and Endangered Species Program (NHESP). The parking lot sites do not contain wetland resource areas regulated pursuant to the Wetland Protect Act and its implementing regulations (310 CMR 10.00).

Environmental Impacts and Mitigation

The project includes construction of 5,000 new commercial parking spaces at two locations. The project is located within previously altered impervious area and will not create new impervious area. According to the DEIR, the new spaces are intended to accommodate existing and anticipated air passenger demand for parking at the Airport while minimizing pick-up and drop-off activity and decreasing regional air passenger-related VMT and associated vehicle emissions. Specifically, the DEIR indicates that the project will reduce carbon dioxide (CO_2), volatile organic compounds (VOC), and oxides of nitrogen (NO_x) emissions by 10%, 11%, and 11% in 2022 when the first 2,000 parking spaces are constructed and 12%, 12% and 11% in 2030 when all 5,000 spaces are constructed (respectively) as compared to the future No-Build Alternative.

In addition to the overall project benefits and HOV related measures required as part of the Logan Parking Freeze, the DEIR indicated that Massport is undertaking additional HOV measures in conjunction with the construction of the proposed 5,000 parking spaces. These include: enhancing existing Logan Express scheduled bus service; expanding Logan Express scheduled bus service; exploring Logan Express scheduled bus service in the urban/downtown area; and investing in additional MBTA Silver Line buses. Massport will also centralize TNC operations to reduce on-Airport congestion and evaluate mechanisms to decrease TNC deadhead trips.

Jurisdiction and Permitting

The project is undergoing MEPA review and requires preparation of a mandatory EIR pursuant to 301 CMR 11.03(6)(a)(7) because it will be undertaken by a State Agency and will construct greater than 1,000 parking spaces in a single location. The project may require a modified Sewer Use Discharge Permit from the Massachusetts Water Resources Authority (MWRA).[1]

[1] This potential Permit was not identified in the ENF.

The project may require a Sewer Permit Modification from the Boston Water and Sewer Commission (BWSC). The project may be subject to Massachusetts Office of Coastal Zone Management (CZM) federal consistency review. The project requires approval by the Federal Aviation Administration (FAA) for changes to the Airport Layout Plan and, therefore, requires an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA). The project also requires a National Pollutant Discharge Elimination System (NPDES) General Permit for Construction from the EPA.

Because the project will be undertaken by a State Agency, MEPA jurisdiction is broad in scope and extends to all aspects of the project that may cause Damage to the Environment, as defined in the MEPA regulations.

Review of the DEIR

Massport filed a joint DEIR/EA to satisfy the MEPA and NEPA review processes. This Certificate applies to the review of the project under MEPA only, and does not restrict the ability of the federal government to act on those aspects of the project subject to NEPA. The DEIR described the proposed project, identified existing conditions, described potential environmental impacts and mitigation measures, provided an expanded discussion of alternatives, and an executive summary of the project in English and in Spanish. The DEIR included an update on state, local, and federal permitting and provided a discussion of permitting requirements and the project's consistency with regulatory standards. At Massport's request, the project was subject to an extended 47-day comment period. Massport's consultant provided supplemental information identifying data and assumptions which have been updated since the ENF was submitted to facilitate MEPA review.[2] For purposes of clarity, references to the DEIR in this Certificate include this supplemental information unless otherwise referenced. Comments from state and regional agencies are generally supportive of the project and acknowledge the overall air quality benefits which will be provided by the project. Comments do not request additional analysis in the form of a Supplemental DEIR.

Though the Executive Office of Energy and Environmental Affairs' (EEA) *Environmental Justice (EJ) Policy* is not applicable to this project, Massport provided outreach consistent with the spirit and intent of the enhanced public participation provisions of the EJ Policy. Massport requested and was granted an extension of the comment period to provide additional time to review and comment on the DEIR. The DEIR included a Spanish language version of the Executive Summary and Spanish language translation was also provided at a Public Information Meeting held the evening of June 25, 2019 at the Logan Airport Rental Car Center. I encourage Massport to continue providing translated Executive Summaries with all future MEPA filings.

As described in the DEIR, the location and number of parking spaces has not changed since the ENF was filed. The DEIR included revised analyses (including updated estimates of projected reductions in VMT and air emissions) based on updated mode share data and passenger projections. The analysis in the DEIR was updated based on a future passenger forecast of 50 million air passengers (MAP) in 2030 (46.5 MAP in the ENF), with an increased HOV mode

[2] Emails sent from Stewart Dalzell (Massport) on 7/30/10 and 8/1/19 to Page Czepiga (MEPA Office).

share. The VMT analysis in the ENF assumed a 2.54 % annual passenger growth rate through 2030 while the analysis in the DEIR assumed a growth rate commensurate with the FAA's Fiscal Year (FY) 2018 Terminal Area Forecast (TAF); which represents a 3.1% passenger growth rate through 2030. The passenger mode share distribution in the DEIR assumed a 30.5% HOV mode share, consistent with the findings of the 2016 *Logan Airport Passenger Ground Access Survey* (27.8% in the ENF, based on 2013 survey data). The DEIR also assumes that Massport will continue to implement policies and programs to achieve a 40% HOV mode share goal by 2027 (37.5% in the ENF).

Alternatives Analysis

The location of the Preferred Alternative (Economy Garage, Terminal E surface lot) has not changed since the ENF was filed. The DEIR included an expanded alternatives analysis that evaluated various massing and circulation alternatives for the Terminal E garage. The massing alternatives included various combinations of four to seven levels on the garage's east and west sides. The circulation alternatives included two options to provide access/egress for public vehicles and limousines at the Terminal E garage. The DEIR did not evaluate massing or access alternatives for the Economy Garage. According to the DEIR, the massing and height of the Economy Garage was determined by FAA airspace height restrictions, structural considerations, and cost. The Preferred Alternative for the Terminal E garage includes a pedestrian bridge connection to the Central Garage with five parking levels on the west side and six parking levels on the east side of the pedestrian bridge. The garage will have two access points for public vehicles, a separate access point for limousines, and a vehicle bridge to the Central Garage complex. The vehicular bridge will be used by Massport to transfer vehicles under overflow conditions. The DEIR indicated that this direct connection will remove vehicles from on-Airport circulation, reduce on-Airport VMT, and provide air quality benefits. The Preferred Alternative for the Economy Garage will construct three additional parking levels on top of the existing structure and a six level addition on the facility's south side. The DEIR indicated that the project will provide an adequate number of parking spaces, reduce on-Airport VMT, provide operational efficiencies, is adjacent to compatible land uses and/or Airport terminals, and it will not require significant changes to existing roadway infrastructure. According to the DEIR, the project will provide sufficient parking to accommodate approximately 10 years of peak-day parking demand.

The DEIR included a brief evaluation of construction phasing and configurations. The Terminal E garage will be constructed first to achieve construction efficiencies with other construction projects at the Airport and to provide increased operational flexibility in managing the parking supply. Additionally, the parking supply in the Terminal E garage will compensate for the temporary loss of 1,000 revenue-generating parking spaces associated with centralizing TNC operations in the Central Garage complex.

Air Quality

As described in the DEIR, if the project was not constructed, the commercial parking supply would become more constrained and approximately 77% of "would-be parkers" would switch to drop-off/pick-up modes. The project is anticipated to shift mode share from drop-off/pick-up modes and result in reductions in regional off-Airport VMT and improvements to on-

Airport roadway conditions compared to the future No-Build scenario. The VMT analysis presented in the ENF assumed that all 5,000 spaces would be operational by 2022. The DEIR included a revised analysis that incorporated the construction phasing and evaluated an interim (2022; 2,000 spaces in Terminal E Garage operational) and full-build (2030; both garages operational with 5,000 spaces) scenario. As noted above, the air quality analysis was also revised since the ENF was submitted to reflect updated passenger forecasts, growth rates, and HOV mode share data. This decreased the projected VMT reduction and emissions reductions benefits compared to those presented in the ENF. The project will result in CO_2, VOC, and NO_x reductions of 10%, 11%, and 11% in 2022 and 12%, 12% and 11% in 2030 (respectively) compared to the future no-build scenario. According to the DEIR, the project will comply with the Clean Air Act General Conformity Rule, the SIP, and will not cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) for these pollutants. The DEIR included the results of a microscale analysis that demonstrated the carbon monoxide (CO) concentrations will be below the NAAQS for both the 1-hour and the 8-hour concentrations.

The analysis is predicated on and Massport has committed to achieving a future HOV mode share goal of 40% by 2027. The DEIR identified the following commitments which Massport plans to implement to improve HOV mode share:

- Providing preferred taxi and TNC line privileges to electric vehicles (EV);
- Training ground transportation personnel to encourage passengers to share rides;
- Increasing Logan Express capacity, measured in available seats, by 10%;
- Purchasing eight more (16 total) MBTA Silver Line buses by 2024 (dependent upon MBTA procurement); and
- Conducting the studies required in the amended Parking Freeze regulations and sharing the findings with MassDEP.

I note monitoring and reporting on the progress towards achieving the goals and success of the mitigation program can be addressed in the Long-Term Parking Management Plan and future Environmental Status and Planning Reports (ESPRs) and Environmental Data Reports (EDRs) (EEA#3247/5146). The DEIR also identified measures Massport will implement to reduce air emissions from Airport operations, including: providing high-speed EV charging stations in taxi, limousine, and TNC lots; working with airlines/tenants to convert commercially available ground source equipment (GSE) to electric power; and working with airlines to increase the use of electric tugs to 60% of aircraft that need re-positioning. I refer Massport to comments from Airlines for America which identify concerns with incorporating measures to reduce emissions from GSE into the draft Section 61 Findings for this project. Comments from the Conservation Law Foundation (CLF) identify additional measures that Massport has agreed to implement to support HOV use and reduce air emissions, including free Blue Line service from the Airport Station for employees, implementation of variable-rate parking and Airport pass-through rate (if warranted based on study results), and incentivizing ride-sharing through reduced fees.

The DEIR indicated that the MBTA Blue Line and Silver Line carry approximately 6% of passengers to/from the airport. This represents an increase of 1,900 total passengers per day in

2030. The DEIR included an analysis of the MBTA's Blue Line ability to accommodate the projected increase in passengers. The analysis assumed passenger loads grew by 1.5% per year to approximate future background growth. The analysis indicated that the Blue Line will have adequate capacity to accommodate the 135 additional weekday evening peak hour passengers boarding at the Airport Station in 2030. As the Silver Line buses are free from the Airport, boarding and alighting data is not collected. Based on this, the DEIR did not evaluate future passenger loads for the Silver Line. The DEIR indicated that Massport will continue to monitor the Logan Express and Massport operated shuttles and will expand the fleet as necessary to ensure they meet Massport customer service requirements. The DEIR indicated that the MBTA's Service Delivery Policy and Massport's policy to expand and improve the Silver Line, Logan Express, and Massport operated shuttles to meet customer service requirements will ensure that public transit services to/from the Airport will have sufficient capacity to accommodate future increases in demand.

Climate Change

Executive Order 569: Establishing an Integrated Climate Change Strategy for the Commonwealth (EO 569; the Order) was issued on September 16, 2016. EO 569 recognizes the serious threat presented by climate change and directs agencies within the administration to develop and implement an integrated strategy that leverages state resources to combat climate change and prepare for its impacts. The Order seeks to ensure that Massachusetts will meet GHG emissions reduction limits established under the Global Warming Solution Act of 2008 (GWSA) and will work to prepare state government and cities and towns for the impacts of climate change.

The GHG Policy and requirements to analyze the effects of climate change through EIR review is an important part of a statewide strategy. These analyses advance proponents' understanding of the projects contribution and vulnerability to climate change.

Greenhouse Gas Emissions

The project is subject to review under the May 5, 2010 MEPA Greenhouse Gas Emissions Policy and Protocol ("the Policy"). The DEIR indicated that the parking garages will be naturally ventilated and that conditioned space will be limited to mechanical/electrical rooms, elevator lobbies, and cashier booths. The DEIR included a GHG analysis that quantified the CO_2 emissions associated with the project's energy use (stationary sources), primarily associated with interior and exterior lighting. Mobile source GHG emissions were calculated in a similar method as the air quality analysis and were based on the anticipated reduction in VMT under future conditions. Massport has committed to the following measures to reduce GHG emissions:

- External wayfinding system to reduce on-Airport VMT, including dynamic informational signage and a reservation system for passengers to reserve and pre-pay for a parking space;
- Internal wayfinding system to reduce in-facility circulation including parking guidance via level occupancy detection;

- Preferred parking spaces for low-emitting and fuel-efficient vehicles amounting to at least 1% of total spaces;
- Reserved parking spaces for EV amounting to at least 1% of total spaces;
- Installation of EV charging stations to accommodate 150% of demand (including construction of 15 EV charging stations in the Terminal E Garage and 5 in the Economy Garage);
- Reduced lighting power densities (LPD) of 0.09 watts/sf (W/sf) inside the parking garages;
- Occupancy sensors and photocells on all interior and exterior lighting (respectively);
- Installation of a solar photovoltaic (PV) system on the Terminal E garage;
- Relocation or replacement of existing solar PV system at the Economy Garage to the top of the facility's new highest level;
- Building Commissioning; and
- Construction waste recycling.

The solar PV array on the Economy Garage will generate 77,800 kWh/year and result in a GHG reduction of 28 tons per year (tpy). The DEIR indicated Massport will evaluate replacing the existing array with a newer and more efficient solar PV system as project design progresses. The DEIR did not evaluate expanding the footprint of the solar PV canopy. The project will also install a 10,000 sf solar PV canopy on the east side of the Terminal E garage which will generate 250,000 kWh/year and result in a GHG reduction of 89 tpy. The DEIR did not provide documentation to support the proposed size of the solar PV canopies, explain why it is not proposed on the west side of the Terminal E garage or within an increased footprint on the Central Garage, nor identify other constraints to expanding the system size. I refer Massport to comments from the Department of Energy Resources (DOER) which indicates a larger solar PV system may be feasible. Additional analysis of solar PV is required in the FEIR.

The project's stationary source GHG emissions were estimated at 1,333 tpy in the Base Case. Through the adoption of energy efficient lighting, the Preferred Alternative will reduce stationary source GHG emissions by 382 tpy, for a total of 951 tpy, or a 28.6% decrease. This does not include the offsets associated with the facilities' solar PV systems, which are identified above. The project's mobile source emissions are summarized in the below table.

Year	Condition	Regional VMT of "would be parkers"	CO_2 Emissions (tpy)
2017	Existing	327,280	153
2022	No-Build	13,584,217	5,079
	Build/Proposed Project	12,279,027	4,497
	Difference	**1,305,190 (10%)**	**582 (11%)**
2030	No-Build	52,130,253	15,126
	Build/Proposed Project	46,922,626	13,314
	Difference	**5,207,627 (10%)**	**1,812 (12%)**

The DEIR indicated the reduction in mobile source emissions is primarily attributed to the reduction in regional VMT as compared to the future No-Build Alternative. This will be achieved through shifting "would be parkers" from drop-off/pick-up modes to parking; reducing the number of trips associated with "would-be parkers" traveling to and from the Airport; reducing recirculation at the Terminal E curbsides and decreasing on-Airport VMT; and reducing on-Airport emissions related to improved curbside operations at Terminal E as air passengers shift from drop-off/pick-up modes to parking in the garages.

Adaptation and Resiliency

The DEIR included a review of the project's design measures for increasing its resiliency to the effects of climate change. The project will incorporate redundant or back-up power sources to protect against extreme weather conditions that may cause power outages. It will also include drought tolerant landscaping along the façade of the Terminal E Garage to minimize the heat island effect and reduce irrigation needs. Stormwater runoff from the Terminal E garage will be collected and used to offset a portion of cooling tower water consumption at the Central Heating Plant. The DEIR briefly described the project's consistency with Massport's Disaster and Infrastructure Resiliency Planning Study and Floodproofing Design Guide. According to the DEIR, critical equipment and infrastructure will be elevated above future projected flood elevations.

Noise

The DEIR included a noise impact assessment to evaluate the potential changes in noise due to a taller Economy Garage. Aircraft ground operations noise was modeled at 11 locations near the Economy Garage both with and without the height increase. According to the DEIR, 8 locations (located north and northwest of the Economy Garage) will experience a decrease in ground noise due to the shielding from the expansion to the Economy Garage. The remaining 3 locations (located west of the Economy Garage) may experience noise increases ranging from 0.1 to 0.4 dB due to sound from aircraft ground operations reflecting off the taller portion of the Economy Garage. The DEIR indicated that the façade of the Economy Garage will consist of a combination of solid walls and open areas which will limit the potential for noise reflection.

Construction Period

Construction of the Terminal E garage will commence in spring 2020 and will be completed in 2022. The six levels on the east side of the pedestrian bridge will be constructed first, followed by the five parking levels on the west side of the bridge. Construction of the Economy Garage expansion will begin in 2023 and be completed by the end of 2025. Construction of the Economy Garage will start at the west end of the garage and proceed towards the east end. I refer Massport to comments from MAPC which recommend constructing the Economy Garage expansion only if/when warranted by demand.

The DEIR described construction phasing and sequencing and provided additional information to identify construction period impacts and measures to control construction traffic, air quality, noise, and water impacts. The DEIR clarified that the Terminal E garage will be

constructed simultaneously with the Terminal E Modernization Project (EEA# 15434) and Terminal C Canopy, Connector, and Roadway Project. The DEIR described construction equipment requirements and identified anticipated construction period trips and truck routes. The DEIR identified measures to reduce construction period traffic impacts, including: developing specific truck routes, coordinating arrival of large equipment, requiring contractors to park off-site, and development of traffic management plans. Measures to reduce construction period air quality impacts include: limiting vehicle idling, using low- or zero-emissions equipment where practicable; retrofitting construction equipment, dust suppression, stabilizing exposed areas, and suspending construction during high-wind conditions. According to the DEIR, Massport will voluntarily comply with the City of Boston's noise control regulations during construction. Portions of the project site are regulated pursuant to the Massachusetts Contingency Plan (MCP; 310 CMR 40.0000). According to the DEIR, an Activity and Use Limitation (AUL) is located on the Economy Garage site and a Release Abatement Measure (RAM) Plan must be submitted with MassDEP prior to any subsurface work on this site.

SCOPE

General

The FEIR should follow Section 11.07 of the MEPA regulations for outline and content, as modified by this Scope. It should include a detailed description of the proposed project and identify, describe, and assess the environmental impacts of any changes in the project that have occurred since the filing of the DEIR. This should also identify any analysis that has been revised since the DEIR was filed based on updated data or projections. The DEIR should include updated site plans for existing and post-development conditions at a legible scale.

The FEIR should provide a brief description and analysis of applicable statutory and regulatory standards and requirements, and describe how the project will meet those standards. It should include a list of required State Permits, Financial Assistance, or other State approvals and provide an update on the status of each of these pending actions. The FEIR should confirm the need for a modified Sewer Use Discharge Permit from the MWRA and include updated mitigation measures and draft Section 61 Findings, as appropriate.

Project Description and Permitting

The FEIR should include site plans for existing and post-development conditions at a legible scale including the proposed garage structures and any curbside improvements and changes to the on-airport roadways. The project description should address access and revenue control systems; anticipated rate structures; and identify hybrid, alternative fuel, and EV parking locations. The 2017 ESPR was filed with the MEPA Office during review of the DEIR. The FEIR should confirm that the analyses presented in the DEIR used the most recent data, projections, and assumptions presented in the 2017 ESPR or should include revised analyses, as necessary.

The amended Parking Freeze regulations require Massport to complete three studies to identify ways to further support alternative transit options to the Airport. The results of these studies can inform ways to further support alternative transit options to and from the Airport and extend the associated air quality benefits of the project. Massport anticipates completing the studies by September 30, 2019. As described above, the FEIR should include the completed studies and a summary of the findings. It should also describe how the results have informed Massport's long-range efforts to address VMT and air quality impacts of different ground access modes to and from the Airport and identify measures that Massport has already implemented. The data and findings should be integrated into the FEIR and mitigation commitments should be updated, as appropriate.

Air Quality

The air quality analysis in the DEIR assumed that the policies and programs undertaken by Massport will achieve a 40% HOV mode share goal by 2027. The FEIR should describe how HOV mode share will be monitored to evaluate the effectiveness of the policies and programs in achieving this goal. The FEIR should demonstrate that the HOV programs/policies and any proposed HOV improvement measures will provide the capacity to meet demand associated with growth. Massport has made significant investments in programs to maintain and increase HOV modes and has been recognized as one of the top-ranking airports in terms of HOV/transit mode share. To support Massport's investments and extend their benefits, the FEIR should include an evaluation of measures to support HOV use and extend the associated air quality benefits of the program and identify to what extent these measures will contribute towards attaining the future mode share goal. This evaluation can be supported by the findings of the three studies required by the amended Parking Freeze regulations.

Greenhouse Gas (GHG) Emissions

As recommended by DOER, the FEIR should analyze the feasibility and GHG mitigation benefits of expanding the proposed canopy solar PV arrays. The analysis should estimate the area available for solar canopies on each of the top parking levels, state the assumed panel efficiency, estimate the electrical output of the system, and identify associated GHG reductions. The analysis should be supported by conceptual plans that identify the "usable areas" for potential solar PV canopy systems and other appurtenances. The analysis should evaluate the east and west sides of the Terminal E Garage and the entire top level of the Economy Garage. The analysis should include a narrative and data (such as a solar reflection study/glare analysis) to support the Proponent's adoption (or dismissal) of solar PV as a feasible measure to avoid, minimize or mitigate project-related GHG emissions and Damage to the Environment. As recommended by DOER, the project should be designed and built to accommodate solar in the future so as not to lose a significant rooftop asset in the event that issues effecting feasibility change.

The DEIR included a commitment to install EV charging stations to accommodate 150% of demand. The FEIR should clarify whether this commitment to meet 150% of demand extends to all on-Airport demand or is limited to the Terminal E Garage and Economy Garage. The FEIR should describe how demand for EV charging stations will be monitored and identify triggers for installation of additional EV stations. The FEIR should clarify whether the parking garages will be constructed as "EV-ready" with conduit to support future installation of EV charging station

or discuss how the construction and design of the garage could otherwise facilitate future expansion of EV charging stations if warranted by demand. This was requested in the Scope for the DEIR and was not provided.

The FEIR should identify the specific measures from the U.S. Green Building Council's Parksmart program which will be incorporated into the structured parking facilities.

The FEIR should provide an updated emission table that compares base case GHG emissions with the Preferred Alternative showing the anticipated reduction in tpy and percentage by emissions source (stationary and mobile).

Construction Period Impacts

The FEIR should describe how construction will occur to avoid impacting the existing constrained parking supply. The FEIR should describe how it will comply with M.G.L. c. 21E during construction, including any applicable AULs. As recommended by EPA, the FEIR should confirm that Massport will require its construction contractors to use Ultra Low Sulfur Diesel fuel, and discuss the use of after-engine emissions controls, such as oxidation catalysts or diesel particulate filters. Off-road vehicles are required to use ultra-low sulfur diesel fuel (ULSD).

Mitigation and Draft Section 61 Findings

The FEIR should include a separate chapter summarizing proposed mitigation measures. This chapter should also include draft Section 61 Findings for each area of impact associated with Massport's Preferred Alternative. It should include a draft Section 61 Finding for use by the MWRA in issuing the modified Sewer Use Discharge Permit (if required). The FEIR should contain clear commitments to implement these mitigation measures, estimate the individual costs of each proposed measure, identify the parties responsible for implementation (either funding design and construction or performing actual construction), and a schedule for implementation. To ensure that all GHG emissions reduction measures adopted by the Proponent in the Preferred Alternative are actually constructed or performed by the Proponent, I require Proponents to provide a self-certification to the MEPA Office indicating that all of the required mitigation measures, or their equivalent, have been completed. The commitment to provide this self-certification in the manner outlined above should be incorporated into the draft Section 61 Findings included in the DEIR.

Response to Comments

The FEIR should contain a copy of this Certificate and a copy of each comment letter received on the DEIR. In order to ensure that the issues raised by commenters are addressed, the FEIR should include direct responses to these comments to the extent that they are within MEPA jurisdiction. This directive is not intended, and shall not be construed, to enlarge the scope of the FEIR beyond what has been expressly identified in this Certificate. The response can refer to future EDRs and/or ESPRs to address issues that are not within the FEIR Scope. I recommend that Massport employ an indexed response to comments format, supplemented as appropriate with direct narrative response.

Circulation

Massport should circulate the FEIR to those parties who commented on the ENF and/or the DEIR, to any State Agencies from which the Proponent will seek permits or approvals, and to any parties specified in section 11.16 of the MEPA regulations. Massport may circulate copies of the FEIR to commenters other than State Agencies in a digital format (e.g., CD-ROM, USB drive) or post to an online website. However, Massport should make available a reasonable number of hard copies to accommodate those without convenient access to a computer to be distributed upon request on a first come, first served basis. Massport should send a letter accompanying the digital copy or identifying the web address of the online version of the FEIR indicating that hard copies are available upon request, noting relevant comment deadlines, and appropriate addresses for submission of comments. The FEIR submitted to the MEPA office should include a digital copy of the complete document. A copy of the FEIR should be made available for review at the following Libraries: Boston Public Library – Main, Orient Heights, and East Boson Branches, Chelsea Public Library, Winthrop Public Library, and Revere Public Library.

August 2, 2019 K. Theoharides
Date Kathleen A. Theoharides

Comments received:

06/26/2019	John Vitagliano
07/25/2019	Environmental Protection Agency (EPA)
07/26/2019	Airlines for America
07/26/2019	Conservation Law Foundation (CLF)
07/26/2019	Metropolitan Area Planning Council (MAPC)
08/01/2019	Massachusetts Department of Environmental Protection (MassDEP)
08/02/2019	Department of Energy Resources (DOER)
08/02/2019	Air Impact Relief, Inc. (AIR)

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Copy of the Secretary of the Executive Office of Energy and Environmental Affairs Certificate issued for the Logan Airport Parking Project Final Environmental Impact Report

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The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

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January 30, 2020

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
FINAL ENVIRONMENTAL IMPACT REPORT

PROJECT NAME	: Logan Airport Parking Project
PROJECT MUNICIPALITY	: Boston
PROJECT WATERSHED	: Boston Harbor
EEA NUMBER	: 15665
PROJECT PROPONENT	: Massachusetts Port Authority (Massport)
DATE NOTICED IN MONITOR	: December 23, 2019

Pursuant to the Massachusetts Environmental Policy Act (MEPA; M.G.L. c. 30, ss. 61-62I) and Section 11.08 of the MEPA Regulations (301 CMR 11.00), I have reviewed the Final Environmental Impact Report (FEIR) and hereby determine that it **adequately and properly complies** with MEPA and its implementing regulations.

Project Description

As described in the FEIR, the project includes the phased construction of 5,000 additional commercial parking spaces at the Logan International Airport (the "Airport"). The project will construct a structured parking garage with 2,000 parking spaces in the location of the existing Terminal E surface parking lot followed by the addition of 3,000 new spaces at the Economy Garage through expansion of the existing facility. The Terminal E Garage will open in 2022 and the Economy Garage expansion will open by the end of 2025. The parking spaces are intended to accommodate existing and anticipated air passenger demand for parking at the Airport. According to the FEIR, the project will reduce drop-off/pick-up activity at the Airport and will reduce regional air-passenger-related vehicle miles traveled (VMT) and associated air emissions.

In addition to the overall air quality benefits, the FEIR indicated that Massport is implementing additional high occupancy vehicle (HOV) mode improvement measures in conjunction with this project. These HOV mode improvement measures include trip reduction strategies that target different methods in how people get to the airport. Parking strategies are one part of the overall trip reduction strategies which includes enhancing Logan Express bus service through expanded parking at existing locations and increased frequency of service, and expanding the Logan Express service area to new suburban locations and urban/downtown areas based on the success of the Back Bay Logan Express pilot program. The FEIR also indicated that Massport has committed to purchase additional Silver Line buses to increase service capacity to the Airport. Additionally, Massport has just began in December 2019 to centralize transportation network company (TNC) (e.g. Uber, Lyft, etc.) operations (i.e. drop-offs and pick-ups) on the ground floor of the Central Garage complex to reduce congestion outside the terminals. Finally, Massport is evaluating mechanism to decrease the number of TNC drivers that leave the Airport without a passenger (i.e., deadhead trips). These mechanisms include both a program called "rematch" at the Central Garage where TNC drivers come in and drop off passengers for the Airport and then the driver is paired up with a passenger who is leaving the Airport, and also a new fee structure for TNCs that decreases the cost of the ride if the TNC driver does a drop-off and then a pick-up.

Project Background and Context

The number of commercial and employee parking spaces allowed at Logan Airport is regulated by the Massachusetts Department of Environmental Protection (MassDEP) through the Massport/Logan Airport Parking Freeze (310 CMR 7.30), an element of the Massachusetts State Implementation Plan (SIP) under the federal Clean Air Act. As previously described in the Environmental Notification Form (ENF) and the Draft EIR (DEIR), peak daily demand for on-Airport (on-site) parking was increasing, resulting in daily demand frequently nearing the Logan Airport Parking Freeze cap. Massport worked with MassDEP on an amendment to the Parking Freeze. The ENF was filed concurrent with MassDEP's issuance of a draft regulation to amend the Parking Freeze to allow the creation of an additional 5,000 commercial parking spaces at the Airport. After the Certificate on the ENF was issued, MassDEP approved the requested parking increase and promulgated the amended regulation on June 30, 2017. The EPA issued a proposed rule approving the revision of the SIP and incorporating the amended Parking Freeze on March 6, 2018, and the rule went into effect on April 5, 2018. The MassDEP regulations provide the larger framework setting overall caps for the Logan Airport Parking Freeze, while project-specific impacts and mitigation measures were intended to be analyzed through the MEPA review process for the Logan Airport Parking Project.

The approved regulations increased the Logan Airport commercial parking limit by 5,000 spaces (from 18,640 to 23,640 spaces) and increased the total cap to 26,088 commercial and employee parking spaces (comprised of 23,640 commercial spaces and 2,448 employee parking spaces). The regulations (310 CMR 7.30(8)) required that Massport complete the following studies, which were completed on September 30, 2019, to identify ways to further support alternative transit options to the airport:

1. A study to evaluate the costs, feasibility, and effectiveness of potential measures to improve HOV access to the Airport. The study should consider, among other things,

possible improvements to Logan Express bus service and the benefits of adding Silver Line buses with service to the Airport.

2. A study of costs and pricing for different modes of transportation to and from the Airport to identify a pricing structure and the use of revenues so generated to promote the use of HOV modes of transportation by air travelers and visitors to the Airport. The study will include evaluation of short-term and long-term parking rates and their influence on different modes of Airport transportation.
3. A study of the feasibility and effectiveness of potential operational measures to reduce non-high occupancy vehicle pick-up/drop-off modes of transportation to the Airport, including an evaluation of emerging ride-sharing and transportation network company modes.

Logan Airport and Project Site

The Airport boundary encompasses approximately 2,400 acres in East Boston and Winthrop, including approximately 700 acres underwater in Boston Harbor. The airfield is comprised of six runways and approximately 15 miles of taxiway. Logan Airport has four passenger terminals, A, B, C, and E, each with its own ticketing, baggage claim, and ground transportation facilities. The Airport is surrounded on three sides by Boston Harbor and is accessible by two public transit lines and the roadway system. The preferred locations for the parking structures are the Economy Garage and the Terminal E surface parking lot. The Economy Garage is located in the northwest portion of the Airport campus at the intersection of Service Road and Prescott Street. It is comprised of two levels and provides over 2,700 spaces. The Economy Garage has an existing rooftop solar photovoltaic (PV) system on its top level which will be relocated or replaced on the top level of the garage following construction. The Terminal E surface parking lot is located within the Airport interior and adjacent to Terminal E.

The Airport is served by several Massachusetts Bay Transportation Authority (MBTA) public transit routes, including Blue and Silver Lines for the rapid transit system, commuter ferry service, and local and express bus routes. Specifically, Massport provides free shuttle service between the Blue Line Airport Station and all Airport terminals and subsidizes the Silver Line Logan Airport Route (SL1) by providing free outbound Silver Line trips from the Airport on eight Silver Line buses purchased for this route by Massport. Massport also operates an extensive Logan Express Bus service, serving five locations. The airport is also served by other private express bus service and intercity bus service as part of the range of HOV modes available for ground access.

The Economy Garage and the Terminal E parking lot sites are both located within the coastal zone of Massachusetts. Both locations are comprised of previously disturbed impervious area. They are not located in Priority or Estimated Habitat as mapped by the Division of Fisheries and Wildlife's (DFW) Natural Heritage and Endangered Species Program (NHESP). The parking lot sites do not contain wetland resource areas regulated pursuant to the Wetland Protect Act and its implementing regulations (310 CMR 10.00).

Environmental Impacts and Mitigation

The project includes construction of 5,000 new commercial parking spaces at two locations. The project is located within previously altered impervious area and will not create new impervious area. The new spaces are intended to accommodate existing and anticipated air passenger demand for parking at the Airport while minimizing pick-up and drop-off activity and decreasing regional air passenger-related VMT and associated vehicle emissions. The project will reduce carbon dioxide (CO_2), volatile organic compounds (VOC), and oxides of nitrogen (NO_x) emissions by 10%, 11%, and 11%, respectively, in 2022 when the first 2,000 parking spaces are constructed and 12%, 12% and 11%, respectively, in 2030 when all 5,000 spaces are constructed, as compared to the future No-Build Alternative.

In addition to the overall project benefits in reducing air pollution, Massport is undertaking additional HOV measures in conjunction with the construction of the proposed 5,000 parking spaces. These include: enhancing and expanding existing Logan Express scheduled bus service; exploring Logan Express scheduled bus service in the urban/downtown area; and investing in additional MBTA Silver Line buses.

Jurisdiction and Permitting

The project is undergoing MEPA review and requires preparation of a mandatory EIR pursuant to 301 CMR 11.03(6)(a)(7) because it will be undertaken by a State Agency and will construct greater than 1,000 parking spaces in a single location.

The project may require a Sewer Permit Modification from the Boston Water and Sewer Commission (BWSC). The project may be subject to Massachusetts Office of Coastal Zone Management (CZM) federal consistency review. The project requires approval by the Federal Aviation Administration (FAA) for changes to the Airport Layout Plan and, therefore, requires an Environmental Assessment (EA) under the National Environmental Policy Act (NEPA). The project also requires a National Pollutant Discharge Elimination System (NPDES) General Permit for Construction from the EPA.

Because the project will be undertaken by a State Agency, MEPA jurisdiction is broad in scope and extends to all aspects of the project that may cause Damage to the Environment, as defined in the MEPA regulations.

Changes since the Filing of the DEIR

The FEIR identified changes to the project since the DEIR was filed. Changes to the new garage in front of Terminal E include a plan is to install an approximately 20,000-square foot (sf) solar PV installation on the garage's eastside. This is an increase from the 10,000-sf solar PV installation proposed in the DEIR. This expanded solar PV system will produce approximately 467,000 kilowatt-hours (kWh) per year, or about 217,000 kWh per year more than the system proposed in the DEIR. This expanded system will offset 50 percent of the proposed garage's total energy (i.e., electricity and natural gas) consumption. In addition, the project will now include construction of additional electric vehicles (EV) charging stations. The DEIR indicated that Massport would install 15 single-port EV charging stations at the new garage in front of Terminal E. The FEIR indicates that Massport, instead, will install 11 double-port stations at this location to accommodate 22 dedicated EV charging parking spaces. As demand grows, Massport

will add EV charging stations to ensure that the garage can accommodate 150 percent of demand.

Changes to the design of the Economy Garage expansion since the filing of the DEIR relate to advancing installation of the additional EV charging stations. The additional EV infrastructure was accelerated to take place at the existing Economy Garage with construction that began in 2019. Massport will also increase the number of EV charging stations as part of the Economy Garage expansion to accommodate 150 percent of demand. Massport has committed to reevaluate the need for the additional 3,000 parking spaces planned as part of the Economy Garage expansion prior to beginning that facility's design and construction process.

Review of the FEIR

Massport filed a joint FEIR and Final Environmental Assessment (Final EIR/EA) to satisfy MEPA, NEPA, and the Federal Aviation Administration's (FAA's) implementing procedures (Order 1050.1F and Order 5050.4B).

This Certificate applies to the review of the project under MEPA only, and does not restrict the ability of the federal government to act on those aspects of the project subject to NEPA or FAA rules. The FEIR described the proposed project, identified existing conditions, described potential environmental impacts and mitigation measures, and provided an expanded discussion of greenhouse gas (GHG) emissions. The FEIR included an update on state, local, and federal permitting and provided a discussion of permitting requirements and the project's consistency with regulatory standards.

Though the Executive Office of Energy and Environmental Affairs' (EEA) *Environmental Justice (EJ) Policy* is not applicable to this project, Massport conducted outreach consistent with the enhanced public participation provisions of the EJ Policy including providing translators at all public meetings, notice of availability of the ENF, DEIR and FEIR in local newspapers in several languages, and translation of the Executive Summary/Introduction for the ENF, DEIR and FEIR.

Alternatives Analysis

The location of the Preferred Alternative (Economy Garage, Terminal E surface lot) has not changed since the ENF was filed. The DEIR included an expanded alternatives analysis that evaluated various massing and circulation alternatives for the Terminal E garage which was expanded in the FEIR. The ENF indicated that the planning process considered six alternative on-airport locations for the structured parking facilities. All of the sites are paved and developed areas that are currently used for parking or vehicle storage. The ENF indicated that each of the sites are comparable in terms of regional VMT and emissions reductions since regional access routes will not vary as a result of the garage siting.

- Harborside Drive – Structured parking in location of existing vehicle layover space
- Porter Street – Structured parking over existing taxi pool
- North Cargo Area – Expand Economy Garage in the location of existing surface parking and the Massachusetts State Police building

- Southwest Service Area – Structured parking in location of current bus/limousine pool and overflow parking
- Economy Garage (Preferred Alternative) – Additional spaces above existing garage
- Terminal E Surface Lot (Preferred Alternative) – Structured parking in location of existing surface parking lot

According to the ENF, the Preferred Alternative was selected based on input from the East Boston Logan Impact Advisory Group (LIAG). The ENF indicated that Harborside Drive and Porter Street sites were eliminated due to potential wayfinding and operational challenges and the North Cargo Area was eliminated due to the need to relocate the existing uses. The Southwest Service Area was eliminated as it would require construction of a new parking structure and integration of existing uses into the ground floor. The ENF indicated that the No-Build alternative was eliminated as it would result in higher pollutant emissions and roadway congestion due to the higher VMT associated with the drop-off/pick-up mode. The ENF identified the Economy Garage and Terminal E Surface Lots as the Preferred Alternative. The ENF indicated the Economy Garage location was selected as the Preferred Alternative because the site access is well defined, it does not require significant changes to existing roadway infrastructure, and it is adjacent to compatible land uses and the Terminal E Surface Lot location was selected due to its proximity to Airport terminals, compatibility with adjacent land uses, and location within the Airport interior to minimize impacts to adjacent communities.

The location of the Preferred Alternative (Economy Garage, Terminal E surface lot) has not changed since the DEIR was filed. The massing and height of the Economy Garage was determined by FAA airspace height restrictions, structural considerations, and cost. The Preferred Alternative for the Terminal E garage includes a pedestrian bridge connection to the Central Garage with five parking levels on the west side and six parking levels on the east side of the pedestrian bridge. The garage will have two access points for public vehicles, a separate access point for limousines, and a vehicle bridge to the Central Garage complex. The vehicular bridge will be used by Massport to transfer vehicles under overflow conditions. This direct connection will remove vehicles from on-Airport circulation, reduce on-Airport VMT, and provide air quality benefits. The Preferred Alternative for the Economy Garage will construct three additional parking levels on top of the existing structure and a six level addition on the facility's south side. The FEIR indicates that the project will provide an adequate number of parking spaces, reduce on-Airport VMT, and provide operational efficiencies; it is also adjacent to compatible land uses and/or Airport terminals, and will not require significant changes to existing roadway infrastructure. According to the FEIR, the project will provide sufficient parking to accommodate approximately 10 years of peak-day parking demand.

The Terminal E garage will be constructed first to achieve construction efficiencies with other construction projects at the Airport and to provide increased operational flexibility in managing the parking supply. Additionally, the parking supply in the Terminal E garage will compensate for the loss of 1,000 revenue-generating parking spaces associated with centralizing TNC operations in the Central Garage complex.

Air Quality

As described in the FEIR, if the project were not constructed, the commercial parking supply would become more constrained and approximately 77% of "would-be parkers" would switch to drop-off/pick-up modes. The project is anticipated to shift mode share from drop-off/pick-up modes and result in reductions in regional off-Airport VMT and improvements to on-Airport roadway conditions compared to the future No-Build scenario. The VMT analysis presented in the ENF assumed that all 5,000 spaces would be operational by 2022. The DEIR included a revised analysis that incorporated construction phasing and evaluated both interim (2022; 2,000 spaces in Terminal E Garage operational) and full-build (2030; both garages operational with 5,000 spaces) scenarios which remain the same in the FEIR. As noted, the project is expected to result in CO_2, VOC, and NO_x reductions of 10%, 11%, and 11%, respectively, in 2022 and 12%, 12% and 11%, respectively, in 2030, compared to the future no-build scenario. According to the FEIR, the project will comply with the Clean Air Act General Conformity Rule, the SIP, and will not cause or contribute to a violation of the National Ambient Air Quality Standards (NAAQS) for these pollutants. The FEIR also presented the results of a microscale analysis, which demonstrated the carbon monoxide (CO) concentrations will be below the NAAQS for both the 1-hour and the 8-hour concentrations.

The analysis is predicated on and Massport has committed to achieving a future HOV mode share goal of 40% by 2027. The FEIR identified the following commitments which Massport plans to implement to improve HOV mode share:

- Providing preferred taxi and TNC line privileges to electric vehicles (EV);
- Training ground transportation personnel to encourage passengers to share rides;
- Increasing Logan Express capacity, measured in available seats, by 10%; and,
- Purchasing eight more (16 total) MBTA Silver Line buses by 2024 (dependent upon MBTA procurement).

The FEIR also provides a summary of what Massport has already begun implementing to improve HOV mode share including:

- Relocating Back Bay Logan Express service to the MBTA's Back Bay Station, eliminating the fare from the Airport to Back Bay, and reducing the fare from Back Bay to the Airport from $7.50 to $3.00. This has already resulted in a substantial increase in ridership since the relocation in May 2019.
- Increasing peak-hour frequency on the Logan Express Braintree service from 30-minute to 20-minute headways.
- Advancing a new urban Logan Express service at North Station with free service from the Airport. Buses for the service have been ordered.
- Offering priority access at the Airport Security Line to customers who take Back Bay Logan Express or any mode of water transportation to the Airport.
- Initiating studies of a new suburban Logan Express location with parking.
- Implementing a new Ride App drop-off fee of $3.25 (in addition to the current $3.25 pick-up fee) and providing a discounted fee of $1.50 for shared-ride (such as UberPool and Lyft Line) customers.
- Implementing parking pricing that discourages short-term parking that is associated with pick-up and drop off uses.

- Piloting use of the South Boston Waterfront Emergency Access Ramp to reduce travel time on the MBTA Silver Line service to help encourage use.
- Consolidating Ride App operations at dedicated areas on the ground floor of the Central Garage to make it easier for drivers to pick up arriving air passengers after dropping off departing passengers without having to circulate around the Airport.

I note that further monitoring and reporting on the progress towards achieving the goals and success of the mitigation program can be addressed in future Environmental Status and Planning Reports (ESPRs) and Environmental Data Reports (EDRs) (EEA#3247). The ESPR provides analysis of the environmental impacts associated with current and projected activity levels and presents a comprehensive strategy to minimize impacts. The ESPR analysis is supplemented by (and ultimately incorporates) the detailed analyses and mitigation commitments of project specific EIRs. The ESPR is generally updated on a five-year basis. The EDRs are filed in the years between ESPRs. The EDR is a retrospective document that is filed annually and identifies environmental impacts based on actual passenger activity and operations.

In addition to Massports' mitigation measures for this project, Massport has committed to implement additional measures to reduce air emissions from Airport operations, including: providing high-speed EV charging stations in taxi, limousine, and TNC lots; working with airlines/tenants to convert commercially available ground source equipment (GSE) to electric power; and working with airlines to increase the use of electric tugs to 60% of aircraft that need re-positioning.

I refer Massport to comments from the Metropolitan Area Planning Council (MAPC) which identify methods for incorporating measures to reduce emissions for this project and methods for Massport's notification when reevaluating the need for the additional 3,000 parking spaces planned as part of the Economy Garage expansion prior to the start of its construction. Comments from the Conservation Law Foundation (CLF) identify additional measures that Massport has agreed to implement to support HOV use and reduce air emissions, including free Blue Line service from the Airport Station for employees, implementation of variable-rate parking and Airport pass-through rate (if warranted based on study results), and incentivizing ride-sharing through reduced fees.

Climate Change

Executive Order 569: Establishing an Integrated Climate Change Strategy for the Commonwealth (EO 569; the Order) was issued on September 16, 2016. EO 569 recognizes the serious threat presented by climate change and directs agencies within the administration to develop and implement an integrated strategy that leverages state resources to combat climate change and prepare for its impacts. The Order seeks to ensure that Massachusetts will meet GHG emissions reduction limits established under the Global Warming Solution Act of 2008 (GWSA) and will work to prepare state government and cities and towns for the impacts of climate change.

The GHG Policy and requirements to analyze the effects of climate change through EIR review is an important part of a statewide strategy. These analyses advance proponents' understanding of the projects' contribution and vulnerability to climate change.

Greenhouse Gas Emissions

The project is subject to review under the May 5, 2010 MEPA Greenhouse Gas Emissions Policy and Protocol ("the Policy"). The parking garages will be naturally ventilated and airconditioned space in both will be limited to mechanical/electrical rooms, elevator lobbies, and cashier booths.

The DEIR included a GHG analysis that quantified the CO_2 emissions associated with the project's energy use (stationary sources), primarily associated with interior and exterior lighting. Mobile source GHG emissions were calculated using a similar method as the air quality analysis and were based on the anticipated reduction in VMT under future conditions. The Scope detailed in the DEIR required that FEIR should include analysis on the feasibility and GHG mitigation benefits of expanding the proposed canopy solar PV arrays as recommended by Department of Energy Resources (DOER) during the review of the DEIR.

The analysis provided in the FEIR estimates the area available for solar canopies on each of the top parking levels, states the assumed panel efficiency, estimates the electrical output of the system, and identifies associated GHG reductions. The analysis is also supported by conceptual plans that identify the "usable areas" for potential solar PV canopy systems and other appurtenances. The analysis presented in the FEIR evaluates the east and west sides of the Terminal E Garage and the entire top level of the Economy Garage.

The project's stationary source GHG emissions were estimated at 1,337 tpy in the Base Case. The Preferred Alternative will reduce stationary source GHG emissions by 367 tpy, for a total of 970 tpy, or a 32.5% decrease. The project's mobile source emissions have not changed from the review of the DEIR and are summarized in the below table.

Year	Condition	Regional VMT of "would be parkers"	CO_2 Emissions (tpy)
2017	Existing	327,280	153
2022	No-Build	13,584,217	5,079
	Build/Proposed Project	12,279,027	4,497
	Difference	**1,305,190 (-10%)**	**582 (-11%)**
2030	No-Build	52,130,253	15,126
	Build/Proposed Project	46,922,626	13,314
	Difference	**5,207,627 (-10%)**	**1,812 (-12%)**

The reduction in mobile source emissions is primarily attributed to the reduction in regional VMT as compared to the future No-Build Alternative. As described above, this will be achieved through shifting "would be parkers" from drop-off/pick-up modes to parking; reducing the number of trips associated with "would-be parkers" traveling to and from the Airport; reducing recirculation at the Terminal E curbsides and decreasing on-Airport VMT; and reducing on-Airport emissions related to improved curbside operations at Terminal E as air passengers shift from drop-off/pick-up modes to parking in the garages.

Adaptation and Resiliency

The project's design incorporates measures for increasing its resiliency to the effects of climate change. The project will incorporate redundant or back-up power sources to protect against extreme weather conditions that may cause power outages. It will also include drought tolerant landscaping along the façade of the Terminal E Garage to minimize the heat island effect and reduce irrigation needs. Stormwater runoff from the Terminal E garage will be collected and used to offset a portion of cooling tower water consumption at the Central Heating Plant. The project will be consistent with Massport's Disaster and Infrastructure Resiliency Planning Study and Floodproofing Design Guide. Critical equipment and infrastructure will be elevated above future projected flood elevations. Critical infrastructure that will raised above the designated design flood elevation for the new facilities, as defined by Massport's Floodproofing Design Guide, include incoming electrical and telecommunications lines.

Construction Period

Construction of the Terminal E garage will commence in spring 2020 and will be completed in 2022. The six levels on the east side of the pedestrian bridge will be constructed first, followed by the five parking levels on the west side of the bridge. Massport has agreed to reevaluate the need for the additional 3,000 parking spaces planned as part of the Economy Garage expansion prior to the start of its construction. Currently construction of the Economy Garage expansion will begin in 2023 and be completed by the end of 2025. Construction of the Economy Garage will start at the west end of the garage and proceed towards the east end. I refer Massport to comments from MAPC which recommend constructing the Economy Garage expansion only if/when warranted by demand.

The Terminal E garage will be constructed simultaneously with the Terminal E Modernization Project (EEA# 15434) and Terminal C Canopy, Connector, and Roadway Project. Massport has committed to measures to reduce construction period traffic impacts, including: developing specific truck routes, coordinating arrival of large equipment, requiring contractors to park off-site, and development of traffic management plans. Measures to reduce construction period air quality impacts include: limiting vehicle idling, using low- or zero-emissions equipment where practicable; retrofitting construction equipment, dust suppression, stabilizing exposed areas, and suspending construction during high-wind conditions. Massport will also voluntarily comply with the City of Boston's noise control regulations during construction. Portions of the project site are regulated pursuant to the Massachusetts Contingency Plan (MCP; 310 CMR 40.0000). An Activity and Use Limitation (AUL) is located on the Economy Garage site. Therefore, a Release Abatement Measure (RAM) Plan must be submitted to MassDEP prior to any subsurface work on this site.

Mitigation and Draft Section 61 Findings

The FEIR includes a separate chapter summarizing proposed mitigation measures. The FEIR also includes an Appendix with draft Section 61 Findings for each area of impact associated with Massport's Preferred Alternative. The FEIR contains clear commitments to implement these mitigation measures, estimates the individual costs of each proposed measure, identifies the parties responsible for implementation (either funding design and construction or performing actual construction), and a schedule for implementation. To ensure that all GHG

emissions reduction measures adopted by Massport in the Preferred Alternative are actually constructed or performed by Massport, Massport has agreed to provide a self-certification to the MEPA Office indicating that all of the required mitigation measures, or their equivalent, have been completed. A summary of the measures Massport has committed to implement to avoid, minimize, and mitigate, environmental impacts is provided below. Refer to Appendix C Table 1 on page C-6 of the FEIR for a description which also estimates the individual costs of each proposed measure and identifies the parties responsible for implementation.

Ground Access Improvement and Trip Reduction

- Advance the electrification of ground service equipment, pursuant to which all ground service equipment will be replaced no later than the end of 2027 (as available);
- Expand Logan Express capacity by 10 percent; and,
- Increase the percentage of zero emission taxi, livery, and Ride App vehicles (i.e., those associated with companies such as Uber and Lyft) by providing: high-speed electric vehicle charging stations at all taxi, livery, and Ride App pools; and taxi and Ride App queue priority to electric vehicles (subject to negotiation with companies).

Project Planning and Design

- Accommodating existing and anticipated air passenger demand for parking to reduce the environmentally undesirable drop-off/pick-up mode share and its associated vehicle miles traveled (VMT) and on and off-Airport air emissions;
- Reusing existing developed areas (i.e., the Project sites avoid undeveloped, greenfield lands);
- Selecting Project sites with community input that are in areas already used for parking (i.e., not introducing a new use), are on existing bus/shuttle routes, and are separated from nearby residential communities;
- Providing added noise barrier benefits to nearby residences and recreation areas, in conjunction with the Terminal E Modernization Project, through the expansion of the existing Economy Garage;
- Providing drivers with roadway and parking information through internal and external wayfinding systems to reduce on- Airport and in-garage circulation, as well as associated VMT and air emissions;
- Providing convenient passenger access between the new garage in front of Terminal E and the terminal buildings and to the pedestrian bridge that connects Terminal E to the Central Garage complex (which includes the West and Central Garages);
- Incorporating the following ground access features into the design of the new garage in front of Terminal E: a secondary entrance for public parkers to reduce on-Airport recirculation and associated VMT; a vehicular bridge connected to the Central Garage complex to enable more efficient operational movements by Massport's Ground Transportation Unit; relying on existing roadway infrastructure, bus routes, and signage for the Economy Garage expansion; and, encouraging parkers to pay their fees prior to returning to their vehicles via Massport's pay-by-foot system, which uses automated kiosks to enable the efficient flow of vehicles exiting the garages and reduce vehicle idling and associated air emissions.

Climate Change Adaptation and Resiliency/ Greenhouse Gas Emissions

- Incorporating measures from the U.S. Green Building Council's (USGBC) Parksmart rating system into the Project's technology, structural design, and operation;
- Reducing lighting power densities from a base of 0.19 watts per square foot to a maximum of 0.05 watts per square foot;
- Installing occupancy sensors and photocells on all applicable interior and exterior lighting;
- Installing programmable thermostats, where applicable (i.e., mechanical/electrical rooms);
- Conditioning electrical and telecommunications rooms with split system heat pumps capable of operating at or below temperature of 0°F;
- Designing the parking decks to be open air, negating the need for ventilation systems
- Performing building commissioning in accordance with ASHRAE Guideline 0-2005 and ASHRAE Guideline 1.1-2007;
- Incorporating a solar PV system at the new garage in front of Terminal E capable of offsetting 50 percent of the facility's total energy consumption, including all lighting and power required for its electric vehicle (EV) charging stations;
- Relocating the existing solar PV system at the Economy Garage to the top of the facility's new highest level upon completion of Project construction (the installation of a newer, more efficient system will be evaluated for feasibility as that construction period gets closer);
- Designing and building the proposed garages to accommodate expanded solar in the future as it becomes more cost effective/feasible;
- Reserving parking spaces for alternative fuel vehicles (e.g., EVs) amounting to at least 1 percent of total spaces and assigning preferred parking spaces for other low-emitting and fuel-efficient vehicles amounting to at least another 1 percent of total spaces;
- Installing 11 EV charging stations (22 ports) in the new garage in front of Terminal E;
- Designing and building the proposed garages to accommodate expanded EV charging infrastructure to accommodate 150 percent of demand;
- Providing tire inflation services for each garage to promote increased fuel efficiency and vehicle safety;
- Integrating vertical landscaping into the façade of the new garage in front of Terminal E;
- Planting water-conserving ground landscapes that apply the principles of xeriscaping (e.g., use of native plants);
- Specifying water efficient fixtures and faucets in a staff restroom at the new garage in front of Terminal E;
- Applying durable design principles to extend the facilities' lifespan and avoid greenhouse gas emissions caused by future large-scale construction and renovation activities;
- Preparing/adhering to a preventative maintenance plan to extend facility lifespan and avoid greenhouse gas emissions caused by future large-scale construction and renovation activities;
- Installing and applying only no- or low-volatile organic compound (VOC) coatings, paints, and sealants;
- Installing halon-free fire suppression systems in each garage Massport/ Construction;

- Complying with Massport's Floodproofing Design Guide and elevating critical equipment and systems above the designated design flood elevations;
- Ensuring redundant or back-up power sources to reduce disruption from extreme weather conditions that may cause power outage;
- Performing frequent sweeping (at least monthly) to reduce the need for constant pressure washing and associated water use;
- Implementing an active recycling program to reduce the amount of waste sent to regional landfills/incinerators and to reduce GHG associated with material disposal;
- Displaying educational materials to convey the facilities' environmentally sustainable design and operations;
- Participating in a recognized sustainable purchasing buying program applicable to non-capital equipment/materials; and,
- Implementing environmentally safe cleaning supplies and providing necessary training to use, maintain, and dispose of these products.

Construction Period Mitigation

- Providing on-Airport storage areas for construction materials;
- Developing specific truck routing and/or staging plans for implementation by the various contractors;
- Encouraging construction companies to provide off-Airport parking for their employees and to provide shuttle services from these locations (shuttles are required to use the Coughlin Bypass road to access the Airport);
- Requiring all construction vehicle/equipment to follow anti-idling procedures and all construction managers to provide associated training;
- Requiring the use of low- or zero-emissions equipment, where practicable;
- Requiring the retrofitting of appropriate diesel construction equipment with diesel oxidation catalyst and/or particulate filters;
- Requiring contractors to use Ultra Low Sulfur Diesel Fuel (ULSD);
- Deploying air quality and fugitive dust management best practices, such as reducing exposed erodible surface areas through appropriate materials and equipment staging, covering exposed surface areas with pavement or vegetation in an expeditious manner, and stabilizing soil with cover or periodic watering;
- Requiring trucks to access the Project sites by Route 1A, Interstate 90, Coughlin Bypass road, and the main Airport roadway only or other routes in compliance with transportation safety requirements;
- Prohibiting trucks from using local streets;
- Putting into place an Erosion and Sedimentation Control Program, in compliance with the Stormwater Pollution Prevention Plan, to protect water quality and to minimize construction phase impacts to Boston Harbor; and,
- Deploying spill prevention measures and sedimentation controls throughout the construction phases to prevent pollution from construction equipment and erosion.

Conclusion

Based on a review of the FEIR and comment letters, and consultation with State Agencies, I have determined that the FEIR adequately and properly complies with MEPA and its implementing regulations. The project may proceed to permitting.

January 30, 2020
Date

K. Theoharides
Kathleen A. Theoharides

Comments received:

01/23/2020 Conservation Law Foundation (CLF)
01/23/2020 Metropolitan Area Planning Council (MAPC)

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Comment Letters and Responses

- The 66 comment letters received by the Massachusetts Environmental Policy Act (MEPA) Office on the *2017 Environmental Status and Planning Report (ESPR)* are reprinted here in the order shown below.
  - Walter Timilty, State Senator
  - Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA
  - Paul Ormond, P.E., Energy Efficiency Engineer – Massachusetts Department of Energy Resources
  - Roselee Vincent, State Representative, 16th District
  - Lydia Edwards, Boston City Council, District 1
  - Christopher Webb, Director of Public Health & Massport Community Advisory Committee – Malden
  - Select Board Town of Milton
  - Chris Marchi, Vice President – Airport Impact Relief, Incorporated (AIR, Inc.)
  - Tim Pohle, Senior Managing Director Environment Affairs - AirlinesForAmerica
  - Staci Rubin, Conservation Law Foundation (CLF)
  - Peter Houk, Medford Representative/Massport Community Advisory Committee
  - Myron Kassaraba, Belmont Representative/Massport Community Advisory Committee
  - Matthew Romero, Massport Community Advisory Committee
  - Maryann Aberg, Logan Aircraft Noise Working Group
  - Michael Adamian, Medford Resident
  - Dorothy Ahle, Malden Resident
  - Gillian Anderson, East Boston Resident
  - Lisa Avery, Medford Resident
  - Edward Beuchert, Somerville Resident
  - Julia Burrell, East Boston Resident

- Carla Ceruzzi, East Boston Resident
- Phoebe Chadwick-Rivinus, Boston Resident
- Cindy Christiansen, Ph.D., Milton Resident
- Frank Ciano, Arlington Resident
- Wendy Corkhum, Winthrop Resident
- Darcy Devney, Arlington Resident
- Teresa Doyle, Jamaica Plain Resident
- Danielle Emond, Resident
- Lindsay Falewicz, East Boston Resident
- Vanessa Fazio, Winthrop Resident
- Barbara Franklin, Resident
- Carol Goss, Cambridge Resident
- Anita Gryan, Arlington Resident
- Gary Gryan, Arlington Resident
- Aileen Healy, Medford Resident
- Kathleen Higgins Shea, Medford Resident
- Martha Karchere, Resident
- Robert Kuhn, Arlington Resident
- Ursula Kullmann, Medford Resident
- Richard Madden, Resident
- David Matheu, Arlington Resident
- Anastacia Marx de Salcedo, Cambridge Resident
- Catherine McNeil, Milton Resident
- Meredith McSorley, Cambridgeport Resident
- Ryan Miller, East Boston Resident

- Sheila Mooney, Belmont Resident
- Rosalind Mott, Resident
- Fabricio Paes, East Boston Resident
- Gaby Perry, East Boston Resident
- Jessica Petriello, Resident
- Thomas Phipps, Medford Resident
- Kathleen Rourke, Medford Resident
- Bill Schmidt, Chair – Winthrop Board of Health
- Noel Scott, Medford Resident
- Claire Silvers/Mark Feeney, Cambridge Resident
- Danielle Simbajon, Medford Resident
- DeNee Skipper, Belmont Resident
- Nat Taylor, East Boston Resident
- Kannan Thiruvengadam, East Boston Resident
- Mary Tittmann, Cambridge Resident
- Nancy Timmerman, P.E., Consultant in Acoustics and Noise Control
- Karla Torres-Welch, Resident
- Bill Trabilcy, Belmont Resident
- Andrea van Wien, Medford Resident
- Maureen Wing, Medford Resident
- Alan Wright, Roslindale Resident

- As part of the comments received by the MEPA Office, a Form Letter was signed by 175 individuals. A copy of the form letter, response, and list of residents is provided in this appendix.

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Comment Letters

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The Commonwealth of Massachusetts
MASSACHUSETTS SENATE

SENATOR WALTER F. TIMILTY
Norfolk, Bristol and Plymouth District

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JOINT COMMITTEE ON VETERANS AND FEDERAL AFFAIRS

Vice Chair
JOINT COMMITTEE ON ENVIRONMENT, NATURAL RESOURCES AND AGRICULTURE

JOINT COMMITTEE ON ECONOMIC DEVELOPMENT AND EMERGING TECHNOLOGIES

JOINT COMMITTEE ON MENTAL HEALTH, SUBSTANCE USE AND RECOVERY

JOINT COMMITTEE ON PUBLIC SERVICE

SENATE COMMITTEE ON BONDING, CAPITAL EXPENDITURES AND STATE ASSETS

November 14, 2019

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Massachusetts Environmental Policy Act ("MEPA") Office
Anne Canaday, EEA No. 3247
100 Cambridge Street, Suite 900
Boston, MA 02114

RE: Comments of Senator Walter F. Timilty in support of the Town of Milton on the Boston Logan International Airport 2017 Environmental Status and Planning report (2017 ESPR)

Dear ~~Secretary Theoharides~~, Dear Madame Secretary

I am writing to you today to stand in full support of the comments submitted by the Town of Milton Select Board dated November 14, 2019. It is imperative that critical consideration be made to the health impacts of the increased flights over Milton and its' surrounding communities. Moreover, both the constant barrage of noise and the public health risk posed by the inequitable flight traffic patterns foisted upon Milton by the Federal Aviation Administration are completely inexcusable. 1-1

Overhead flights cause extreme disruptions to daily life, affecting sleep patterns and lessening individual productivity. Therefore, for all of the reason delineated above, I am, respectfully, requesting that the Massachusetts Environmental Policy Act Office strongly embrace the Town of Milton's concerns with the Boston Logan International Airport 2017 Environmental Status and Planning Report. . 1-2

I appreciate your attention to this pressing matter. Please do not hesitate to contact my office with any question or concerns that may arise.

Sincerely,

Walter F. Timilty

Walter F. Timilty
State Senator
Norfolk, Plymouth, Bristol District

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The Commonwealth of Massachusetts

HOUSE OF REPRESENTATIVES
STATE HOUSE, BOSTON, MA 02133-1054

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VICE CHAIR:
TRANSPORTATION

POST AUDIT AND OVERSIGHT
CONSUMER PROTECTION AND
PROFESSIONAL LICENSURE

November 20, 2019

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

Re: Boston Logan International Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides:

I write to express my concerns about the Logan International Airport Environmental Status and Planning Report (EEA 3247, ESPR 2017), as submitted. Upon careful review of ESPR 2017, it is evident that many of the forecasts contained within the document, particularly projected passenger and aircraft activity growth, are implausibly low and out of step with actual measurements in recent years. Massport has chronically underestimated projected growth rates during a period of rapid expansion. This has deprived the community of the opportunity to meaningfully review the full extent of potential environmental impacts at Logan Airport and, critically, resulted in inadequate planning, infrastructure, and mitigation to offset the true effects of rapid expansion. ESPR 2017 must be updated to reflect a more accurate projection of growth in operations, along with a corresponding plan to provide adequate mitigation in surrounding areas for the associated impacts. 2-1

Massport has forecasted passenger growth levels in ESPR 2017 to be 1.5%, with aircraft operations growth forecasted at 1.2%. These figures appear to be unreasonably low estimate given current trends at Logan Airport. Over the previous five years, passenger growth averaged 5.6%, with aircraft operations growth averaging around 1.5%. ESPR 2011 predicted that airport passenger volumes would reach about 33 million by 2019, but instead we are on pace to see almost 43 million passengers this year, 10 million passengers over the estimate. This is an increase from 26.5 million passengers in 1998, an additional 16.5 million passengers in a little under 20 years, representing a 62% increase. This growth is far greater than what was presented to the community in any reporting by Massport during this time period. Additionally, Massport's projected growth rates are out of sync with both their own Future Planning Horizon forecast as well as the Federal Aviation Administration's Terminal Area 2-2
Forecast estimates. There is currently no credible evidence that Logan Airport growth will suddenly slow within

the next several years, in light of historic data, regional trends, or current plans for expansion by airlines and Massport alike. 2-2

Environmental impacts resulting from this growth have also correspondingly increased during this time frame. Estimates in the ESPR reveal that residents exposed to 65 day-night average sound level (DNL) or higher, which are the populations most impacted by airport noise across the region, have doubled, going from 3,947 in 2011 to 7,943 in 2017. This noise increase has been exclusively concentrated in East Boston, with the exception of a small section of Chelsea, even as noise levels in some other areas have reduced. In East Boston, the number of residents exposed to 65 DNL have astoundingly risen over 1300%, from 331 residents in 2011 to 4,734 in 2017. ESPR 2017 also reports that nighttime operations at the airport have increased by about 43% over six years, from 117.1 modelled operations in 2010 to 167.6 in 2017. Such nighttime operations may cause health issues for residents in neighboring communities, contributing to problems associated with sleep interruption, hypertension, and some neurological disorders. Levels of nitrogen oxides (NOx), a key predictor of respiratory illness, have increased by 46% in five years, from 4,077 kg per day in 2011 to 5,935 kg per day in 2017. In addition, average weekday traffic associated with the airport has grown by almost 25% since the last ESPR report, from 104,863 trips in 2011 to 130,601 in 2017. We also know that 2018 alone saw the addition of 12 million new transit network company (TNC) rides to and from Logan Airport, with 5 million of those rides being dead-head trips with no passengers. These increases in environmental impacts can be directly related to the growth of Logan Airport operations and passenger levels during this time frame.

A direct consequence of the continued underestimation of growth in Massport's environmental disclosure documents is the failure to provide adequate solutions to issues associated with expansion and appropriate mitigation to deal with increased impacts such as those described above. Because these documents chronically underestimate forecasted growth, we have failed to advance viable solutions to transportation issues associated with airport passenger access and measures to mitigate the effects of noise and pollution. Had these forecasts more accurately estimated the growth we have seen in recent years, a more rigorous transportation plan could have been put in place to head off our current transportation challenges in the region, and more robust noise abatement measures and air quality programs implemented to protect the health and wellbeing of neighboring communities. Now, however, we are forced to play catch-up.

The consequences of unmitigated airport growth have had serious effects. Traffic to and from Logan Airport is a major contributor to the current regional transportation crisis in and around East Boston. Our transit system cannot function efficiently without additional investment, and planning and investment that accurately account for growth at Logan Airport cannot be implemented when forecasts are repeatedly a fraction of the actual increases. As we pursue solutions to these congestion issues, it is essential that we have accurate estimates of Logan Airport growth so that these increases can be accounted for in planning the future of our transportation system.

A number of long-term transit infrastructure improvements would be beneficial to decreasing the traffic footprint caused by Logan Airport, and its subsequent burdens both on Logan's passengers and the region as a whole. Investments to the Blue Line, including signal upgrades and the construction of the Red Line-Blue Line connector, would allow for increased capacity and frequency going toward downtown, as well as providing a direct connection to important economic corridors along the Red Line. Construction of a Silver Line Underpass at D Street would allow the Silver Line to operate more efficiently and bypass some of the traffic issues it currently faces. The ESPR would also be enhanced by further discussion and analysis of the impacts of high-speed rail and water transportation projects, as well as airport regionalization strategies and the potential effects of airport ground access fees. These projects, while important, are not presently considered under the ESPR. 2-3 While this infrastructure is not solely the responsibility of Massport, these forms of transit serve or would serve significant numbers of Logan Airport passengers, and increasing their capacity and efficiency is vital to improving transit to and from the airport. Massport cannot continue to look only at on-campus solutions to transit issues exacerbated by Logan operations, which have permeated well beyond the confines of their borders. Massport should examine how they can contribute to the realization of these regional improvements in conjunction with MassDOT, the MBTA, and other relevant stakeholders. 2-4

While long-term improvements will take time to design and construct, there are many other infrastructure and operational improvements that can be achieved in a much shorter time frame. The recent reconfiguration of pick-up and drop-off facilities for TNCs at Logan Airport is a good first step toward making the rideshare system more efficient and reducing deadhead trips. Massport should continue to monitor and make improvements to this system 2-5
to ensure that TNC ridership operates with the greatest possible efficiency and minimal impacts. Overall, however, the greatest improvements will be to get passengers out of TNCs and into high occupancy vehicles.

Improvements to Logan Express service offer the greatest potential to reduce traffic impacts associated with 2-6
Logan Airport. By increasing the frequency, availability, and affordability of Logan Express, Massport can make the service more attractive to passengers, reducing customer reliability on private vehicles and TNCs. Increased frequency and availability makes Logan Express more accessible, and increasing its visibility shows travellers its potential as a viable and attractive transit option. Additionally, with more dedicated bus lanes, it would be seen as a faster alternative to traffic-burdened TNCs, especially for travellers who are concerned with making their flight on time. Massport can also make Logan Express easier to use by developing shuttle terminus locations that provide more comprehensive services off-site, such as airline and rental car services, remote baggage check, low-cost on-site parking facilities, and prioritized curbside passenger pick-up and drop-off areas. Expanding the number of shuttle locations and providing increased services would decentralize operations and reduce vehicle traffic from the congested surroundings of Logan Airport. Massport should seriously consider implementation of 2-7
these various measures in order to address ongoing issues.

Worsening air pollution and noise exposure which has resulted from expansion is also of great import, as is the inadequate acknowledgement and mitigation of the associated health consequences. Aircraft and ground support activity necessary to increase passenger volumes far beyond forecasted levels has created significant escalation in noise and pollution, which carry serious public health implications. Massport should take responsibility for increasing noise abatement and pollution control measures to a magnitude at least equal to that of current and 2-8
planned expansions. Updating the Preferential Runway Advisory System (PRAS) is essential to regional noise mitigation, and would be an effective component of this document's evaluation. Additionally, decreasing the 2-9
impact of nighttime flights by diverting activity to overwater air traffic corridors should be vigorously pursued. Massport should also explore all legal and logistical pathways to imposing increased landing fees on nighttime 2-10
flights. Schools within the 60 DNL contour, and within the 65 DNL contour in particular, should receive increased 2-11
soundproofing assistance in order to protect from the exceptional amount of excess noise pollution caused by aircraft operations. It is critical that the widespread effects of noise pollution are thoroughly mitigated as noise 2-12
contours continue to adjust and, in places like East Boston, intensify in densely populated areas.

Increased ground access and airfield activity are also responsible for rising emissions of pollutants such as NOx, ultrafine particulates, and other gases and particulate matter. The health impacts of such pollutants are a serious issue with substantial public health impacts for communities surrounding Logan Airport. It is of vital importance that Massport take steps to mitigate these harmful emissions directly and effectively. One significant way to 2-13
mitigate such pollutants would be air filtration projects for schools, community spaces, and residential homes in the most significantly-impacted areas. Moreover, the level of mitigation should account for not only the significant gap between Massport's previous estimates and current reality, but also the likely emissions resulting 2-14
from a more accurate, realistic projection of future growth.

The consequences of past underestimations in forecasted growth contained in the ESPR have manifested in significant increases in adverse impacts on surrounding communities to Logan Airport. These existing impacts should be fully documented, analyzed, and mitigated under the environmental review process currently underway. 2-15
Massport has a responsibility to address and fully account for the full range of impacts resulting from airport growth.

Sometimes the modelling just gets it wrong. This is a reality of formulating projections. However, when various models are consistently, repeatedly underestimating impacts by a significant margin, whether they be passenger

level estimates, traffic estimates, or pollution estimates, this becomes an issue. Modelling that systematically underestimates leaves communities systematically underprepared to deal with the impacts. Neighboring communities are saddled with unfair burdens and insufficient mitigation. This level of airport growth and environmental degradation speaks to a need for an enhanced level of response and mitigation from what was offered in ESPR 2017. Mitigation based on projections that have fallen short of reality have similarly fallen short of providing the necessary offsets for our communities. We can and must do better for the residents of my district and that of other neighborhoods, cities, and towns surrounding Logan Airport.

I respectfully request that the Executive Office of Energy and Environmental Affairs require Massport to provide
a revised description and analysis of the potential increases in passenger and aircraft operational levels in a 2-16
Supplemental High Growth Scenario which incorporates more accurate growth rates over the next five years for
passenger and aircraft activity levels, in line with recent trends at Logan Airport. These forecasts should be
accompanied by Revised Impact Projections, which similarly describe and analyze future noise, emissions, and 2-17
traffic burdens in a more realistic manner. Massport should subsequently adjust mitigation implementation
commitments to proactively address the future environmental implication of these scenarios to accurately alleviate 2-18
conditions in already burdened environmental justice communities. These changes will lead to a more robust and
more accurate final report on the growth of Logan International Airport.

Thank you for the opportunity to comment on this matter. Over one hundred of my constituents in East Boston have shared their concerns about the shortcomings of ESPR 2017, and I am aware that other elected officials across Greater Boston have received similar outreach from their constituents. This level of public engagement in the ESPR is the largest we have seen in years, and underscores just how serious these impacts have been. I am confident that the Executive Office of Energy and Environmental Affairs will recognize the importance of requiring common-sense adjustments in this critical planning document. Please do not hesitate to contact me should you have any questions.

Sincerely,

Adrian C. Madaro
Representative
1st Suffolk District

COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF
ENERGY AND ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENERGY RESOURCES
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BOSTON, MA 02114
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Charles D. Baker
Governor

Karyn E. Polito
Lt. Governor

Kathleen Theoharides
Secretary

Judith F. Judson
Commissioner

18 November 2019

Kathleen Theoharides, Secretary
Executive Office of Energy & Environmental Affairs
100 Cambridge Street
Boston, Massachusetts 02114
Attn: MEPA Unit

RE: Boston-Logan International Airport, Environmental Status and Planning Report (ESPR), EEA #3247

Cc: Maggie McCarey, Director of Efficiency Programs, Department of Energy Resources
Judith Judson, Commissioner, Department of Energy Resources

Dear Secretary Theoharides:

We've reviewed the Environmental Status and Planning Report (ESPR) for 2017 (published July 2019) for Boston Logan International Airport. ESPRs are produced periodically to provide a comprehensive review of environmental conditions and impacts associated with the airport.

We are pleased to see that, in response to DOER's recommendation, the ESPRs now track the following:

a. GHG emissions in buildings, normalized by square foot (lbs CO2/sf-yr)
b. Energy use in buildings, normalized by square foot (kBtu/sf-yr)

The addition of these metrics will help provide important insights into the performance of Logan's buildings and help plan for the future.

Recommendations for Future Reports

Moving forward, we recommend that future planning reports incorporate and consider the following:

- Massachusetts' changing electric grid emissions; and 3-1
- Opportunities for distributed renewable generation

The following provides a discussion of each of the above.

Massachusetts' Changing Electric Grid Emissions

Massachusetts currently has among the lowest grid emissions in the nation, at 700 lbs/MWhr. In the future, this emission rate will be even lower due to the continued addition of renewables onto the grid throughout the Commonwealth. In 2050, Massachusetts grid emission rate is expected to be about 200 lbs/MWhr.

In Massachusetts, today, building space heating with cold-climate rated electric heat pumps/VRF equipment has about 40% less emissions than space heating with best-in-class (95%) condensing natural gas equipment. By 2050, heat pumps/VRF will have about 80% less emissions. Similar is true for water heating, as well.

For Massachusetts facilities such as Logan that use combined heat and power (CHP) to heat, cool, and power buildings, the emission picture is more complex. In order to fully analyze buildings' GHG emissions, we recommend the following:

- Space and water heating end use consumption should be estimated and broken down by heating which is provided by central plant steam versus heating provided by fossil-fuel fired (or other) equipment;
- Similarly, space cooling end use consumption should be estimated and broken down by
  cooling from central plant produced chilled water versus cooling provided by other non- 3-1
  CHP means;
- CHP heating and cooling production efficiency and power production efficiency should be estimated.

Once the above is estimated, building space heating, space cooling, and service water heating emissions can then be estimated. This analysis should be done using electric grid emissions of 700 lbs/MWhr, representative of today's emissions and 200 lbs/MWhr, representative of future emissions.

The results of this analysis will help plan Logan's space and water heating strategies considering current and future Massachusetts grid emissions.

Opportunities for Distributed Renewables Generation

Future reports could also explore the potential to host distributed renewables, such as rooftop PV, throughout the airport. For example, Logan's parking garages are relatively large and generally have unobstructed exposure which can offer significant potential opportunity to host solar PV. 3-1

Referencing our 2 August 2019 DEIR review for Logan's two parking garage projects, we estimated that these two parking garages could host more than 4.5MW of solar PV, generating more than 6,000 MWhrs/yr of electric power, offsetting more than 2,100 tons of emissions per year. The Partner's Health Care Garage in Somerville provides an example of rooftop PV in a parking garage setting.

Solar PV on top of Partners Parking Garage Somerville MA

In summary, our recommendation for future planning reports is to consider changing grid emissions and seek opportunities to host renewable generation. 3-1

Sincerely,

Paul F. Ormond, P.E.
Energy Efficiency Engineer
Massachusetts Department of Energy Resources

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Commonwealth of Massachusetts

HOUSE OF REPRESENTATIVES
STATE HOUSE, BOSTON, MA 02133-1054

ROSELEE VINCENT
STATE REPRESENTATIVE
REPRESENTING THE PEOPLE OF THE
16TH SUFFOLK DISTRICT
REVERE • CHELSEA • SAUGUS

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VICE CHAIR
Bonding, Capital Expenditures and State Assets

Joint Committees on:
Revenue
Cannabis Policy

November 20, 2019

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

Re: Boston Logan International Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides:

As the State Representative who represents residents in Revere, Chelsea and Saugus who are impacted by the operations of Logan International Airport, I write to express discuss my concerns about the recent Logan Environmental Status and Planning Report (EEA 3247, ESPR 2017), as submitted. Upon careful review of ESPR 2017, it is evident that many of the forecasts contained within the document, particularly projected passenger and aircraft activity growth, are implausibly low and out of step with actual measurements in recent years. Massport has chronically underestimated projected growth rates during a period of rapid expansion. This has deprived the community of the opportunity to meaningfully review the full extent of potential environmental impacts at Logan Airport and, critically, resulted in inadequate planning, infrastructure, and mitigation to offset the true effects of rapid expansion. ESPR 2017 must be updated to reflect a more accurate projection of growth in operations, along with a corresponding plan to provide adequate mitigation in surrounding areas for the associated impacts. 4-1

Massport has forecasted passenger growth levels in ESPR 2017 to be 1.5%, with aircraft operations growth forecasted at 1.2%. These figures appear to be unreasonablyan unreasonbly implausibly low estimate given current trends at Logan Airport. Over the previous five years, passenger growth averaged 5.6%, with aircraft operations growth averaging around 1.5%. ESPR 2011 predicted that airport passenger volumes would reach about 33 million by 2019, but instead we are on pace to see almost 43 million passengers this year, 10 million passengers over the estimate. This is an increase from 26.5 million passengers in 1998, an additional 16.5 million passengers in a little under 20 years, representing a 62% increase.

This growth is far greater than what was presented to the community in any reporting by Massport during this time period. Additionally, Massport's projected growth rates are out of sync with both their own Future Planning Horizon forecast as well as the Federal Aviation Administration's Terminal Area Forecast estimates. There is currently no credible evidence that Logan Airport growth will suddenly slow within the next several years, in light of both historic data, regional trends, or current plans for expansion by airlines and Massport alike.

Environmental impacts resulting from this growth have also correspondingly increased during this time frame. Estimates in the ESPR reveal that residents exposed to 65 DNL or higher, which are the populations most impacted by the worst of airport noise across the region, have doubled, going from 3,947 in 2011 to 7,943 in 2017. This noise increase has been exclusively concentrated in East Boston, with the exception of a small section of Chelsea, even as noise levels in some other areas have reduced. In East Boston, the number of residents exposed to 65 DNL have astoundingly risen over 1300%, from 331 residents in 2011 to 4,734 in 2017. ESPR 2017 also reports that nighttime operations at the airport have increased by about 43% over six years, from 117.1 modelled operations in 2010 to 167.6 in 2017. Such nighttime operations may cause health issues for residents in neighboring communities, contributing to problems associated with sleep interruption, hypertension, and some neurological disorders. Levels of NOx, a key predictor of respiratory illness, have increased by 46% in five5 years, from 4,077 kg per day in 2011 to 5,935 kg per day in 2017. In addition,And average weekday traffic associated with the airport has grown by almost 25% since the last ESPR report, from 104,863 trips in 2011 to 130,601 in 2017. We also know that 2018 alone saw the addition of 12 million new transit network company (TNC) rides to and from Logan Airport, with 5 million of those rides being dead-head trips with no passengers. These increases in environmental impacts can be directly related to the growth of Logan Airport operations and passenger levels during this time frame.

A direct consequence of the continued underestimation of growth in Massport's environmental disclosure documents is the failure to provide adequate solutions to issues associated with expansion and appropriate mitigation to deal with increased impacts such as those described above. Because these documents chronically underestimate forecasted growth, we have failed to advance viable solutions to transportation issues associated with airport passenger access and measures to mitigate the effects of noise and pollution. Had these forecasts more accurately estimated the growth we've seen in recent years, a more rigorous transportation plan could have been put in place to head off our current transportation challenges in the region, and more robust noise abatement measures and air quality programs implemented to protect the health and wellbeing of neighboring communities. Now, however, we are forced to play catch-up.

The consequences of unmitigated airport growth have had serious effects. Traffic to and from Logan Airport is a major contributor to the current regional transportation crisis in and around East Boston. Our transit system cannot function efficiently without additional investment, and planning and investment that accurately account for growth at Logan Airport cannot be implemented when forecasts are repeatedly a fraction of the actual increases. As we pursue solutions to these congestion issues, it is essential that we have accurate estimates of Logan Airport growth so that these increases can be accounted for in planning the future of our transportation system. 4-2

A number of long-term transit infrastructure improvements would be beneficial to decreasing the traffic footprint caused by Logan Airport, and its subsequent burdens both on Logan's passengers and the region as a whole. Investments to the Blue Line, including signal upgrades and the construction of the Red Line-Blue Line connector, would allow for increased capacity and frequency going toward downtown, as well as providing a direct connection to important economic corridors along the Red Line. Construction of a Silver Line Underpass at D Street would allow the Silver Line to operate more efficiently and bypass some of the traffic issues it currently faces. 4-3 The ESPR would also be enhanced by further discussion and analysis of the impacts of high-speed rail and water transportation projects, as well as airport regionalization strategies and the potential effects of airport ground access fees. 4-4 These projects, while important, are not presently considered under the ESPR. While this infrastructure is not solely the responsibility of Massport, these forms of transit serve or would serve significant numbers of Logan Airport passengers, and increasing their capacity and efficiency is vital to improving transit to and from the airport. Massport cannot continue to look only at on-campus solutions to transit issues exacerbated by Logan operations, which have permeated well beyond the confines of their borders. Massport should examine how they can contribute to the realization of these regional improvements in conjunction with MassDOT, the MBTA, and other relevant stakeholders. 4-5

While long-term improvements will take time to design and construct, there are many other infrastructure and operational improvements that can be achieved in a much shorter time frame. The recent reconfiguration of pick-up and drop-off facilities for TNCs at Logan Airport is a good first step toward making the rideshare system more efficient and reducing deadhead trips. Massport should continue to monitor and make improvements to this system to ensure that TNC ridership operates with the greatest possible efficiency and minimal impacts. Overall, however, the greatest improvements will be to get passengers out of TNCs and into high occupancy vehicles. 4-6

Improvements to Logan Express service offer the greatest potential to reduce traffic impacts associated with Logan Airport. By increasing the frequency, availability, and affordability of Logan Express, Massport can make the service more attractive to passengers, reducing customer reliability on private vehicles and TNCs use. Increased frequency and availability makes Logan Express more accessiblean easier option to use, and increasing its visibility shows travellers its potential as a viable and attractive transit option. 4-7 Additionally, with more dedicated bus lanes, it would be seen as a faster alternative to traffic-burdened TNCs, especially for travellers who are concerned with making their flight on time. 4-8 Massport can also make Logan Express easier to use by developing shuttle terminus locations that provide more comprehensive services off-site, such as airline and rental car services, remote baggage check, low-cost on-site parking facilities, and prioritized curbside passenger pick-up and drop-off areas. Expanding the number of shuttle locations and providing increased services would decentralize operations and reduce vehicle traffic from the congested surroundings of Logan Airport. Massport should seriously consider implementation of these various measures in order to address ongoing issues. 4-9

No less serious is the worsening air pollution and noise exposure which has resulted from expansion, and the inadequate acknowledgement and mitigation of the associated resulting health consequences. Aircraft and ground support activity necessary to increase passenger volumes far beyond forecasted levels has created significant escalation in noise and pollution, which carry serious public health implications.

Massport should take responsibility for increasing noise abatement and pollution control measures to a magnitude at least equal to that of current and planned expansions. Updating the Preferential Runway Advisory System (PRAS) is essential to regional noise mitigation, and would be an effective component of this document's evaluation. Additionally, decreasing the impact of nighttime flights by diverting activity to overwater air traffic corridors should be vigorously pursued. Massport should also explore all legal and logistical pathways to imposing increased landing fees on nighttime flightsoperationslandings. Schools within the 60 DNL contour, and within the 65 DNL contour in particular, should receive increased soundproofing assistance in order to protect from the exceptional amount of excess noise pollution caused by aircraft operations. It's critical that the widespread effects of noise pollution are thoroughly mitigated as noise contours continue to adjust and, in places like East Boston, intensify in densely populated areas. 4-10

Increasing ground access and airfield activity are also responsible for rising emissions of pollutants such as NOx, ultrafine particulates, and other gases and particulate matter. The health impacts of such pollutants are a serious issue with substantial public health impacts for communities surrounding Logan Airport. It is of vital importance that Massport take steps to mitigate these harmful emissions directly and effectively. One significant way to mitigate such pollutants would be air filtration projects for schools, community spaces, and residential homes in the most significantly-impacted areas. Moreover, the level of mitigation should account for not only the significant gap between Massport's previous estimates and current reality, but also the likely emissions resulting from a more accurate, realistic, projection of future growth. 4-11

The consequences of past underestimations in forecasted growth contained in the ESPR have manifested in significant increases in adverse impacts on surrounding communities to Logan Airport. These existing impacts should be fully documented, analyzed, and mitigated under the environmental review process currently underway. Massport has a responsibility to address and fully account for the full range of impacts resulting from airport growth. 4-12

Sometimes the modelling gets it wrong. This is a reality of formulating projections. However, when various models are consistently, repeatedly underestimating impacts by a significant margin, whether they be passenger level estimates, traffic estimates, or pollution estimates, this becomes an issue. Modelling that systematically underestimates leaves communities systematically underprepared to deal with the impacts. Neighboring communities are saddled with unfair burdens and insufficient mitigation. This level of airport growth and environmental degradation speaks to a need for an enhanced level of response and mitigation from that offered in ESPR 2017. Mitigation based on projections that have fallen short of reality have similarly fallen short of providing the necessary offsets for our communities. We can and must do better for the residents of my district and that of other neighborhoods, cities, and towns surrounding Logan Airport. 4-13

I respectfully request that the Executive Office of Energy and Environmental Affairs require Massport to provide a revised description and analysis of the potential increases in passenger and aircraft operational levels in a Supplemental High Growth Scenario which incorporates more accurate growth rates over the next five years for passenger and aircraft activity levels, in line with recent trends at Logan International Airport. 4-14

These forecasts should be accompanied by Revised Impact Projections, which similarly describe and analyze future noise, emissions, and traffic burdens in a more realistic manner. Massport should subsequently adjust mitigation implementation commitments to proactively address the future environmental implication of these scenarios to accurately alleviate conditions in already burdened environmental justice communities. These changes will lead to a more robust, more accurate final report on the growth of Logan International Airport.

Thank you for the opportunity to comment on this matter. Over one hundred of my constituents in East Boston have shared their concerns about the shortcomings of ESPR 2017 in addressing noise, and I am aware that other elected officials across Greater Boston have received similar outreach from their constituents. This level of public engagement in the ESPR is the largest we've seen in years, and underscores just how serious these impacts have been. I am confident that the Executive Office of Energy and Environmental Affairs will recognize the importance of requiring common-sense adjustments in this critical planning document. Please do not hesitate to contact me should you have any questions.

Sincerely,

RoseLee Vincent

RoseLee Vincent
State Representative
16th Suffolk District

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Boston City Council
LYDIA EDWARDS
Councilor – District 1

November 20, 2019

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs (EEA)
ATTN: MEPA Office
Anne Canady, EEA: #3247
100 Cambridge Street, Suite 900. Boston, MA 02114

Re: Comments on the Logan Airport 2017 ESPR

Dear Secretary Theoharides:

As a resident of East Boston and as the District City Councilor representing the neighborhood, I am pleased to submit comments regarding Logan Airport's 2017 Environmental Status and Planning Report.

East Boston bears significant environmental burdens from transportation pollution. Pollutants from vehicles worsen air quality and impact the health of residents in our community and neighboring communities. Exhaust from air traffic and ground vehicles at Logan Airport itself play a substantial role in creating this burden, while vehicle trips to and from the airport contribute to traffic congestion in the neighborhood and further impact public health.

As you know, a state mandated study released in 2014 found increased incidence of childhood asthma and increased incidence of chronic obstructive pulmonary disorder (COPD) in communities surrounding the airport, particularly those in the high exposure area. Since that time, although airplane technology has improved, the volume of flights have increased and traffic congestion has become severe in East Boston.

ONE CITY HALL SQUARE | BOSTON, MA 02201 | BOSTON.GOV | 617-635-3200 (w) | 617-635-4203 (f)

The Massachusetts Port Authority has, to its credit, invested in strategies to reduce on-site emissions -- reducing pollution from vehicles it directly owns and operates -- and established partnerships with the East Boston Community Health Center. These are important efforts to improve worker health and safety and to help residents manage health impacts. Regardless, there is a continued need to reduce air pollution and mitigate its impacts.

Additionally, the state, city and quasi-public entities cannot ignore the climate impacts of air travel and all parties should be planning to track, reduce and mitigate these impacts. Notwithstanding substantial deference to federal jurisdiction in regulations surrounding aviation, state agencies and Massport can look to provide competitive lease terms, offer grants, host sustainability challenges and evaluate relevant incentives and tax policies to guide the airlines that utilize Logan Airport toward sustainability.

Multiple stakeholders have reached out to my office expressing skepticism about Massport's projections for growth as identified in the ESPR, noting that, in past filings, the Port Authority has *significantly* underestimated growth and undercompensated for it. I appreciate the ongoing dialogue with regard to the projections for future activity and impacts and relevant modeling. It is imperative that the Commonwealth verify to the greatest extent possible the accuracy of current reporting and future projections and ensure mitigation by Massport is commensurate with the scale of the problem. 5-1

Both the ESPR and public presentations have tied an increase in activity and in certain pollution impacts to passenger growth, which Massport asserts is increasing due largely to positive economic conditions. If this is the case, any movement toward economic recession in coming years should also evidence a reduction of (or, at a minimum, a drastic slowing of any growth in) air pollution.

In the ESPR, Massport does identify and project a decrease in several pollutants, including carbon monoxide (CO), particulate matter (PM_{10}/$PM_{2.5}$), and volatile organic compounds. While these are positive trends, the ESPR also indicates and projects a significant increase in NO_x, which is attributed to a negative side effect of newer aircraft technology.

Pollution from Logan Airport's operations, including NO_x, exacerbates asthma and chronic obstructive pulmonary disorder (COPD) and increases the likelihood of childhood asthma, and does so in environmental justice communities neighboring the airport. It is urgent that the state consider this burden and disparate impact of airport pollution when reviewing the ESPR.

Massport can take multiple steps to address the environmental burdens of Logan Airport's operations in addition to the strategies laid out in the ESPR. Installing air filtration systems in public housing, public schools, community centers and private homes would build on existing work to support asthma management by preventing certain health impacts from happening. Massport already has experience in soundproofing homes and in working with researchers and state and federal agencies to ensure the effective implementation. Applying these experiences to prevent known air pollution and health impacts, and partnering with researchers currently studying the impacts of ultrafine particulate matter, would be a boon to East Boston.

With regards to non-aerial transportation by Massport, to and from Massport properties, and other transportation in East Boston, Massport can also take additional steps. If any revenue from Massport's airports are ineligible for these uses, Massport could direct revenues from land leases elsewhere in Boston to help implement these priorities. For example: 5-2

- Massport can and should continue to expand efforts to provide express bus service to Logan Airport. Expanding advertising of express bus services and continuing to analyze commuting and traffic patterns to identify new locations for bus service is an important tool; and 5-3
- Massport can increase bus or shuttle services to other Massport facilities such as Worcester and research flight destinations of travelers hailing from regions between Boston and Central Massachusetts. With adequate flight service and transportation to the airport, some travelers might opt toward flights from Worcester. This could help manage traffic congestion and air impacts in Metro Boston, and could potentially provide positive economic impacts for one of Massachusetts' gateway cities. Because Worcester is also an environmental justice community, any such changes should be extremely thoughtful, but

redirecting some vehicle trips from a congested inbound trip to a far less congested "outbound" trip may be a net positive; and

- Massport can partner in supporting our area public transit systems to compensate for airport-related vehicle traffic. To do so, it could establish an operating subsidy for ferry service, support an expansion in the MBTA Blue Line's capacity, to offset traffic congestion. As noted, if any revenue from Massport's airports are ineligible for these uses, Massport could direct revenues from land leases elsewhere in Boston to help implement these priorities; and 5-4
- Massport can shift car rentals at Logan Airport toward electric vehicles by partnering with or incenting car rental companies to offer preferential rates and/or expanding advertising for electric vehicles, and by partnering with city and state government and area utilities to continue to grow and map electric vehicle charging locations; and 5-5
- Massport can also collaborate with city and state stakeholders to develop zoning and building standards for new development, or for substantial retrofits, to ensure construction is adequately insulated and ventilated to address nearby air pollution from transportation sources such as airplanes and off-highway emissions. 5-6

I appreciate the work of Massport to document and present both environmental impacts and strategies to address them. Regardless, at this time, I do not believe the state should certify the 2017 ESPR until two specific conditions are met. First, the Commonwealth should thoroughly review Massport's projections for both passenger growth and air pollution and comment as to whether past inaccuracies have been resolved. 5-7 Second, understanding the present burdens on the environmental justice community of East Boston, the Commonwealth should require air pollution *reductions* and strategies to provide air filters to community residents in their homes and in the public facilities which they frequent. 5-8

Regards,

Lydia Edwards

Lydia Edwards
Boston City Councilor, District One

AC

Letter #6

CITY OF MALDEN
Health Department / Board of Health
110 Pleasant St., 2nd Flr
Malden, MA 02148
781-397-7000 ext. 2049 (P)
Christopher Webb, Director

November 12, 2019

RECEIVED
NOV 18 2019
MEPA

The Honorable Kathleen A. Theoharides,
Secretary Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA# 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

Dear Madam Secretary,

As of this writing, the City of Malden feels it is under represented in the 2017 Environmental Status and Planning Report (ESPR). This under representation is due to the lack of noise and pollution monitoring devices in the affected areas of Malden. The City of Malden has, since the inception of RNAV, been experiencing an increase in aircraft noise complaints and concerns over particulate matter and associated health issues due to the narrow and crowded flight paths of the approaching and departing aircraft.

As you know, noise monitors measure environmental sound by continuously sampling the surrounding sound pressure energy. In order for a monitor to "recognize" an aircraft noise event, the sound pressure must rise above the background (ambient) noise level for a certain amount of time. Each monitor has a threshold value that is set to allow the monitor to discriminate between ambient noise and noise events. Malden would like to have a decibel measurement device located in proximity to the flight path over Malden so that the next ESPR can include Malden specific data relative to aircraft noise. 6-1

Noise and air pollution not seen in the past is a concern and by relocating the noise/ pollution measurement equipment, analysis can be done on the number of planes (424,024 aircraft operations for 2018) , their altitude, and the decibel levels generated. These factors can then be used to develop comprehensive information on the social and economic costs of airport operations such as the costs of healthcare for children with Asthma, COPD, increased rates of heart disease, early cognitive decline, autism, hypertension, sleep interruption, and many other chronic diseases.

In closing, as the Malden representative to the MCAC I will be dedicating my time on the committee towards the installation of these measuring devices to ensure future measurement and analysis of the RNAV system and its effect on the health safety and welfare of the citizens of Malden and the inclusion of these results in future ESPR.

I look forward to working with the Executive Office of Energy and Environmental Affairs, Massport and the MCAC on these important health and quality of life issues.

Sincerely,

Christopher Webb
Dir. of Public Health & MCAC Member
City of Malden

File

COMMONWEALTH OF MASSACHUSETTS
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SECRETARY
KATHLEEN M. CONLON
MEMBER
RICHARD G. WELLS, JR.
MEMBER

November 14, 2019

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Massachusetts Environmental Policy Act ("MEPA") Office
Anne Canaday, EEA No. 3247
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: Comments of the Town of Milton on the Boston Logan International Airport 2017 Environmental Status and Planning Report (2017 ESPR)

Dear Secretary Theoharides,

The Select Board of the Town of Milton ("Milton") is pleased to provide the following comments in response to the Boston Logan International Airport 2017 Environmental Status and Planning Report ("2017 ESPR"):

1. Scope of the 2017 ESPR

In Milton's January 2017 comments to Massport's 2015 Environmental Data Report ("EDR"), we noted several concerns we sought to be addressed in the 2016 ESPR (deferred to 2017):

A. The off-airport impacts of the growth of Boston Logan International Airport ("Logan"), including increased throughput and increased aircraft operations. We were specifically concerned about how the increased demand for airport services impacts the surrounding communities, including increasing the volume and concentration of overflights, and increasing the amount of nighttime operations and nighttime overflights. We noted that each of these impacts must be studied in order to have a true assessment of the environmental impacts resulting from operations at Logan.

   We appreciate that the 2017 ESPR does address some off-airport impacts of Logan operations. However, we feel the bulk of the report is still focused on the environmental impact of operations <u>at</u> Logan, rather than <u>around</u> Logan. Failing to

fully address off-airport impacts ignores the robust science that demonstrates that airport operations can impact communities as far as 10 miles beyond the airport location, particularly where those communities are overflown by multiple RNAVs and the aircraft traffic is concentrated and persistent.

B. We were and remain concerned that there is no analysis of the cumulative impacts from increasing numbers of RNAVs flown over surrounding communities. As discussed in numerous other comment letters, there are three RNAVs that overfly Milton, with two others proposed. Looking at these impacts in isolation does not provide an actual assessment of on-the-ground impacts – some of which are reflected in the increasing number of noise complaints filed in these communities.

C. We urged, and we repeat this request, that Massport and the Secretary must move to a more updated method for noise assessment (e.g., N70, which focuses on the number of noise events greater than 70 dB(A)[1]), and either discontinue using the DNL standard, or reduce the threshold at which noise impacts are considered significant, as well as increase the frequency with which it is calculated. The logarithmic nature of the DNL standard, which has been widely criticized, combined with the fact that this calculation is most often calculated on an annual basis "masks" the acute impacts a succession of aircraft flying over a home has on the sleeping residents within, and also masks the acute impacts felt in a community when it is overflown for hours on end, with little break in the incoming aircraft. Massport has the ability to calculate DNL on a much more frequent basis, and is supposed to be calculating this figure monthly but chooses not to do so. Calculating DNL across shorter time periods (e.g., monthly, weekly), would provide a more accurate indication of the suffering that Milton residents are enduring as a result of concentrated flightpaths and long hours of overuse, and would compel Massport to act to reduce airplane noise in Milton and other communities. 7-1

D. We continue to urge real and substantive collaboration between Massport, the Secretary, and the communities impacted by Logan overflights. Multiple communities surrounding Logan (not just Milton) take the brunt of the impact of the operations of Logan, and the situation has worsened substantially since the FAA implemented NextGen. These communities should have direct and regular access to Massport and the Secretary, and both agencies should be willing to work on real and meaningful solutions to address the problems from airport operations – especially noise and pollution -- occurring in those communities. While we understand some of that work must be done via the Massport Community Advisory Committee ("MCAC"), the large size and the organization of the MCAC has the unintentional effect of diluting the voices of the most affected communities. With respect to the MIT study, three years after it began, Milton's requests for specific analysis and relief through that study have not yet been acted upon. 7-2 7-3

[1]https://www.infrastructure.gov.au/aviation/environmental/airport_safeguarding/nasf/files/1.3_Guideline_A_attachment1.pdf

2. Increased Airport Operations and Impacts on Surrounding Communities

Massport consistently undersells the increased number of airline operations and passenger throughput at Logan, by comparing aircraft operation numbers to pre-2000 data. This comparison is no longer valid, as airlines have significantly changed their modes of operation in the intervening 15 years, by relying on progressively larger airplanes, with progressively larger, more powerful, and louder jet engines. Further, the implementation of the FAA's RNAV systems has also changed how aircraft arrive and depart over surrounding communities.

It is important that Massport's forecasting through its ESPR be correct, as that forecast becomes the basis for planning and mitigation of the impacts of Logan operations for the next five years (at least). Massport's forecasting of growth as set forth in the 2011 ESPR was off by as much as 300%. According to that document, Logan throughput would grow by approximately 1.5% per year, and Logan would handle 38.9 million passengers by 2030. Instead, the 2017 ESPR reports that Logan surpassed 38.9 million passengers in 2017, 13 years ahead of forecasts. Passenger counts (and increased environmental impact from those passengers on the airport and off of the airport, including in the surrounding communities overflown by airport operations) increased by 12 million passengers, to 40.9 million in 2018.

This is hardly surprising. In our 2015 EDR comments we indicated that we believed the growth in airport passenger traffic and airport operations would continue to increase. As set forth in the text above, the 2017 ESPR proves our beliefs to be correct. What is missing from the analysis, however, is recognition that these operations come with a cost -- the impacts to Milton and other communities continue to increase. While we understand and support Logan's role in the economic development of New England, we believe that development cannot come at the price of the right of citizens to peacefully co-exist within their homes. There needs to be a better balance between the economic success of the region and the duty of Massport and the airline community to protect the neighbors and communities underneath the publicly owned airspace through which they travel. 7-4

Such rapid growth is only going to continue, but once again, Massport under-projects growth. The 2017 ESPR growth forecasts predict 50 million passengers within the next 10-15 years. However, with the present 5% annual growth,[2] increasing operations of JetBlue and Delta which

[2] According to the 2017 ESPR (p. 2-3):

Logan Airport is an important origin and destination (O&D) airport both nationally and internationally and is one of the fastest growing major U.S. airports in terms of number of passengers over the past five years. From 2016 to 2017, U.S. passenger traffic grew by 3.5 percent, whereas Logan Airport experienced a passenger growth of 5.9 percent. In 2017, passenger activity levels reached an all-time high of 38.4 million passengers and aircraft operations totaled 401,371, in direct response to the strong national and regional economies. In 2018, passenger activity levels reached 40.9 million and aircraft operations totaled 424,024. Despite the increase in passengers, aircraft operations at Logan Airport for both 2017 and 2018 remained well below the 487,996 operations in 2000 and the historic peak of 507,449 operations reached in 1998 (Figure 2-1 and Figure 2-2). This has been the result of a steady increase in aircraft size at the Airport and improving aircraft load factors (passengers/available seats). Note also, as mentioned above, that JetBlue and Delta are building hubs at Logan.

are building competing hubs at Logan,[3] and the improvements to Terminal E bringing in even more international flights, 50 million passengers will be reached by 2022, or 8-12 years ahead of the 2017 ESPR forecasts. Given Massport's persistent understatement of the growth of its Logan operations, we believe the Secretary should not accept the 2017 ESPR as an accurate baseline planning tool without further scrutiny, and should require Massport to justify and explain why its ESPR projections consistently fall short of foreseeable growth rates. 7-5

3. Increased Noise Complaints Reported

Table 6-22 demonstrates that no single community made as many complaints on the Noise Complaint Line as Milton, although the numbers for other communities are catching up. Overall, and in Milton, both the number of complaints and the number of callers has increased. In 2016 Massport received 21,796 complaints from 466 callers. Those numbers increased to 23,940 complaints from 486 individual callers in 2017. For reference, the 2014 EDR reported 2,669 complaints and 4,991were reported in the 2015 EDR. That represents almost a 900% increase in the number of complaints filed. Overall, Massport reports an 89% increase in the number of individual complainers on the noise complaint line, from 2016 to 2017 in all 15 reported overflown communities. Complaints on the Massport complaint line from Milton have continued to increase since 2012, coinciding with and increasing as the use of performance-based navigation at Logan has been implemented.

The 2017 ESPR does not discuss the importance of noise annoyance as a factor of environmental impact and harm. Noise annoyance in the Logan overflight communities -- which includes lack of sleep, disrupted and interrupted sleep, interrupted conversation, and impacts on use of outside spaces such as decks and yards, playgrounds, and civic spaces – is growing. This noise annoyance is not simple NIMBYism, it is a public health issue, as further discussed below. These are real impacts, suffered by real people, who live in nearby communities. It is outrageous that Massport virtually ignores these complaints in the 2017 ESPR, and still has no plan in place to address impacts on these citizens. The closest analogy is climate change, which impacts the day-to-day lives of many citizens. Further, like climate change, the noise from Logan operations impacts citizens across boundaries, yet no one community is empowered to find a solution. Instead, we must turn to our leaders at the state level, including the EOEEA for oversight, empowerment, and solutions.

4. Increased Nighttime Operations

Nighttime operations at Logan – defined as from 10:00 P.M. to 7:00 A.M. – continue to increase. Nighttime operations increased by 15% from 2016 to 2017 (Table 6-4). Total nighttime operations have increased by almost 100% since 1990.

Although the noise complaint data is not broken down by time of day (either that the complaint was filed, or that the complaint concerned), it follows that some portion of the increase in complaints in Milton and other communities is driven by increased nighttime operations. Data

[3] https://www.forbes.com/sites/tedreed/2019/07/23/jetblue-to-delta-in-boston-come-and-get-us/#556512660cc8

continues to be developed which indicates airplane noise in overflown communities disrupts sleep patterns, which has been shown to result in adverse human health impacts.

Information from Milton residents indicate that the noise from airplanes in Milton is clearly heard above background noise in both commercial and residential areas. As elected officials, we hear frequently from Milton residents who suffer from interrupted sleep, anxiety and a reduced quality of life because of the noise pollution caused by very frequent – and some days continuous – flights over Milton at low altitudes. Indeed, this is one of the two most common requests for relief we receive from residents. We cannot overstate the seriousness of the health problems that these RNAVs cumulatively pose for Milton residents, and the adverse cumulative environmental impact that the RNAVs and the low flying planes have on our entire community. The noise from airplane overflights can also negatively impact property values. Fewer buyers are willing to purchase a home in an area with known noise impacts, and prices can be suppressed. Meanwhile, recent buyers have been vocal on social media that they would not have purchased a home in Milton had they been aware of the amount of airplane noise in the town.

We request that the Secretary work with the FAA, Massport, and Milton to implement late night aircraft restrictions, similar to those set forth in 740 CMR 24.04, which are protective of Milton and its residents. 7-6 In particular, it is important to discuss restrictions on RNAV usage and routes that overfly residential neighborhoods, including spreading the routes further so that the nighttime noise is less concentrated in residential neighborhoods, or moving routes over the ocean during certain periods of time. 7-7 Specifically, as there are already nighttime restrictions on arrivals to runway 4L, we request the same restrictions (no arrivals between 11:00 PM and 6:00 AM) for runway 4R. See Massachusetts Port Authority Noise Rules and Regulations I.1(b), Summary of Runway Use Restrictions, Boston Logan International Airport (May 2, 2016) (also referenced in FAA BOS ATCT Noise Abatement Order 7040.1H). 7-8 In addition, early-morning departures from runway 27 also routinely overfly Milton and the other communities under the runway 27 RNAV.

5. Air Pollution and Public Health.

The 2017 ESPR only discusses air pollution from airport operations in the context of the actual operations of Logan airport, on Logan property. We repeat our comments to the 2014 and 2015 EDRs that this perspective is overly and conveniently narrow. 7-9 Recent studies at LAX (Hudda, et al., May 2014) found ultrafine particle (UFP) counts as far as ten miles from heavily used arrival runways. Although study of the negative effects of UFPs are ongoing, UFPs are believed to have negative effects on respiratory and cardiovascular health in humans, and Massport does not dispute that UFP pollution is an issue at Logan[4]. We are disappointed that the 2017 ESPR did not consider the developed science on this important environmental impact to the citizens living in the Logan overflight area. The health of our residents, employees, and visitors depends upon policy and operational procedures that takes this data into account.

We request that the Secretary direct Massport, in conjunction with the Department of Public Health ("DPH") and the Department of Environmental Protection ("DEP"), to conduct noise and 7-10

[4] https://www.wgbh.org/news/local-news/2019/09/24/air-pollution-from-logan-airport-harms-surrounding-communities-research-shows

air pollution studies in communities like Milton which receive a substantial number of low-flying arrival aircraft. This work would be consistent with the evolving science on this point, and protective of the residents in these communities. We further request that the scope of the future EDRs be expanded to consider the health impacts from increased and concentrated arrival and departure operations due to RNAVs, and that pollution data be measured for every community under any of the many Logan RNAVs, and that no new RNAV overflight paths be put into use until such study is complete and all parties agree that no additional detrimental effects will be experienced by residents in communities bearing the brunt of low-flying airplane overflight. 7-10 7-11

6. Dwell and Persistence

Dwell and persistence relate to the length of time that noise impacts occur. As defined by Massport, dwell is a daily measure while persistence is calculated over a period of 3 days. Both measures define exceedance as being more than a set number of hours of operation between 7:00 AM and midnight (7 hours for dwell, 23 hours for persistence), meaning that the nighttime operations that Milton is often subjected to are not counted towards this measure. Also, in contrast to the annual Preferential Runway Advisory System ("PRAS") goals, Massport uses the number of hours the runway is in operation, not the actual number of operations that take place on that runway, creating a misleading and inaccurate picture of what is happening on the ground.

For example, Figure 6-17, creates the false impression that dwell and persistence exceedance is a relatively small issue for people living under the 4s even though the 4s typically see the plurality of operations annually.[5] The reason for this is two-fold:

1. As defined, the period from midnight to 7:00 AM is not counted in these figures. Therefore, Milton could – and does – see constant air traffic through the night but not have this traffic count towards dwell and persistence exceedance counts.
2. Some runways are given "credit" towards dwell and persistence exceedance counts because they are available for use but are not experiencing any flight operations.[6]

This omission of night-time operations from the dwell and persistence calculations harms communities like Milton because it discounts the negative impact that constant operations have on daily life by ignoring the existence of sleep interruption created by these nighttime flights. This rise in air traffic means that more flights will be overhead when residents are trying to sleep at a time when a) Massport's calculations are demonstrably understated (in Table 6-20, Massport predicts that nighttime flights will only reach 167.75 per day for the Future Planning Horizon –

[5] 2017 was an anomalous year as Runway 4R/22L was closed from May 15 - June 23, 2017 and had reduced availability through September 15th for 4R arrivals because of construction at Logan. In comparison, arrivals to 4R and 4L totaled (57,899 to 4R and 7,274 to 4L) in 2018, or 35.3% of all arrivals for the year. Also – please note that Table 6-6 erroneously notes this anomalous decline as an improvement in effective usage for 4R/L under PRAS.

[6] Logan will often report that 15R is available for arrivals when 4R is in use, giving 15R "credit" towards dwell and persistence calculations. However, arrivals on 15R are rarely if ever observed at times when 4R is in use, as demonstrated by the disparity in arrival numbers. In the anomalous 2017, 4R saw 21.6% of arrivals compared to 15R's 4.4%. The 2018 figures are more indicative of a typical year as 4R saw 31.4% of arrivals and 15R saw but 0.4%.

an increase of 0.15% despite double-digit growth in the years prior), and b) Massport regularly fails to optimize over-water operations during nighttime hours.

7. Conclusion and Request for Assistance.

Thank you for your attention to and consideration of our comments on the 2017 ESPR. We believe that there can be solutions available to remedy and mitigate the ongoing impact of Logan operations on the residents of Milton. We request that the Secretary work with Massport, Milton, the MCAC, and other affected communities to help remedy the multiple impacts discussed above. Specifically, the requests made are as follows: 7-12

a. Not to certify the 2017 ESPR and to direct Massport to prepare a Supplemental ESPR which fully and realistically addresses projected increases to Logan operations and airport throughput, and the resulting environmental impacts; 7-13
b. Work with the FAA, Massport, and Milton to develop and implement late-night aircraft overflight restrictions which are protective of Milton and its residents, including consideration of an 11:00 PM to 6:00 AM landing prohibition on runway 4R; 7-14
c. Direct Massport and the MCAC to promptly develop a system for the fair and equitable distribution of aircraft overflights that provides real relief to the highly impacted surrounding communities, especially those that are under multiple RNAVs; 7-15
d. Direct Massport to collaborate with DPH and DEP to develop and conduct noise and air pollution studies in highly impacted surrounding communities, especially those that are under multiple RNAVs; 7-16
e. Direct Massport to consider off-airport noise and pollution impacts, including but not limited to the health impacts from increased and concentrated arrival and departure operations due to RNAVs, in all communities under any RNAV, in all future EDRs 7-17
f. Direct Massport to include all of the points made above in the scope of the 2017 ESPR. This includes impacts to health from noise and pollution from: off-airport impacts of growth, cumulative impacts of RNAV overflights, increased nighttime operations, moving to updated noise measurements which are more protective of human health and which account for acute impacts more realistically than the DNL standard; and working directly with impacted communities to more fully understand and evaluate the human health effects from Logan operations. 7-18
g. Include the hours from midnight to 7:00 AM in the dwell and persistence calculations to provide a clearer indication of the noise burden being borne by communities subject to nighttime operations. 7-19

We would appreciate a time to meet with you and your staff to personally discuss the concerns we have outlined here, as well as our specific requests for assistance.

Sincerely,

Select Board of the Town of Milton

Michael F. Zullas, Chair

Melinda A. Collins

Melinda A. Collins, Vice Chair

Anthony J. Farrington

Kathleen M. Conlon

Kathleen M. Conlon

Richard G. Wells, Jr.

cc: Representative Stephen F. Lynch
Representative Ayanna Pressley
U.S. Senator Elizabeth A. Warren
U.S. Senator Edward J. Markey
State Senator Walter F. Timilty
State Representative William Driscoll
State Representative Daniel Cullinane
Milton Board of Health
Milton Airplane Noise Advisory Committee Chair Andrew Schmidt
MCAC Representative Thomas Dougherty
Town Counsel Karis North

November 18, 2019

Secretary of Energy and Environmental Affairs
Executive Office of Energy and Environmental Affairs
EEA # 3247
Attention Anne Canaday, anne.canaday@mass.gov
100 Cambridge Street, Suite 900
Boston, MA 02114

Subject: Boston Logan International Airport 2017 Environmental Status and Planning Report

Dear Secretary Theoharides:

Thank you for the opportunity to comment on EEA 3247, the Logan Airport Environmental Status and Planning Report 2017 (ESPR 2017). Since ESPR 2011, AIR, Inc. and many other commenters have highlighted concerns with segmentation, inaccuracies, and omissions in Massport's Logan Airport MEPA environmental disclosure reporting. With this in mind, we would first like to acknowledge Massport and EEA for providing an extended comment period for ESPR 2017. We would also like to thank MEPA for holding a stakeholder feedback meeting with AIR, Inc. during the comment period.

MEPA Procedural Reform

AIR, Inc.'s ESPR 2017 comments begin with a call for ***EEA to continue our recent helpful dialogue in developing further advances in community engagement and collaboration***. The current 5 year planning, reporting, comment, and approval system used for Logan MEPA environmental review does not provide adequate opportunity for the exchange of valuable ideas. Instead, it polarizes planning stakeholders and isolates Massport planners from helpful and valid public feedback. Better community engagement would create opportunity for more frequent exchanges of ideas and goal sharing and produce more refined and effective MEPA Project filings. 8-1

Response to Comments

Since ESPR 2011, the MEPA has successfully collected and acknowledged thoughtful comment through numerous airport EIR and EDR processes. Subsequent EEA certificates have instructed Massport that "the 2017 ESPR should include direct responses to commenters", with "sufficient information to address comments on traffic, air quality, and public health which are common concerns…" and "...to propose measures to implement the goal of maintaining or reducing Logan's overall environmental impacts, even as annual passenger volumes rise in the future.". EEA has also encouraged Massport to "...continue a productive dialogue with interested stakeholders." We believe Massport's responses have fallen well short of the intent of these

directives. Our previous comments[1] have focused on Segmentation and procedural injustice within Massport's MEPA disclosure filings, public health impacts, and the air quality and noise impact increases associated with the additional aircraft and ground access activity which will be served by the Terminal E Modernization and Logan Airport Parking projects, neither are project specific or project component to cumulative impacts, nor are procedural concerns substantially addressed within 2017 ESPR or it's appendices. ***We urge EEA to extend its 2017 ESPR response period beyond the traditional 7 day period to provide opportunity for MEPA to collect further public feedback on acceptable standards of response.*** 8-1

Request for Supplemental Data

In reviewing airport environmental policy proposals which are based on growth forecasts MEPA is asked to consider Proposals which risk unmitigated environmental impacts which result from forecasting errors. Commenters from Hull, Dorchester, Milton, Jamaica Plain, South Boston, Cambridge, downtown Boston, Winthrop, East Boston, Chelsea, Roslindale, Watertown, Medford, Somerville, Arlington, South End, Revere, Sudbury, and Newton have pointed out that inaccurate forecasts in ESPR 2011 resulted in traffic, noise, and air pollution impacts which vastly outpaced mitigation strategies and policies put forth in that document. While ESPR 2011 predicted a 12 million annual passenger increase by 2030, the Boston region absorbed this level of activity by 2017, 13 years ahead of schedule. The negative impacts of those 9 million additional passengers were not documented, nor have mitigation and policy strategies been prepared for MEPA review and public comment.

2017 ESPR growth forecasts propose long term growth of 1% per year and 50 million passengers within the 10 - 15 year planning horizon (a five year window centered around 2032). With actual annual passenger growth at Logan fluctuating between 4.7% and 6.2% between 2017 and 2019, Massport's revelations that Delta and Jetblue alone are planning to add 5.7 million seats by 2021[2], the 50 million passenger mark should be exceeded by 2022. In this likely scenario an additional 14 million passengers' worth of noise, air pollution, and traffic implications which are not currently presented in 2017 ESPR will push environmental and health burdens further in the wrong direction. ***We ask EEA to manage this risk by requiring Massport to develop and analyze a High Passenger and Aircraft Growth Scenarios which is based upon recent actual growth rates in a Supplemental ESPR submission. These High Growth Scenarios should be accompanied by impact forecasts, and mitigation and policy strategies and implementation schedules which seek to protect the public from adverse increased impacts proactively.*** 8-2

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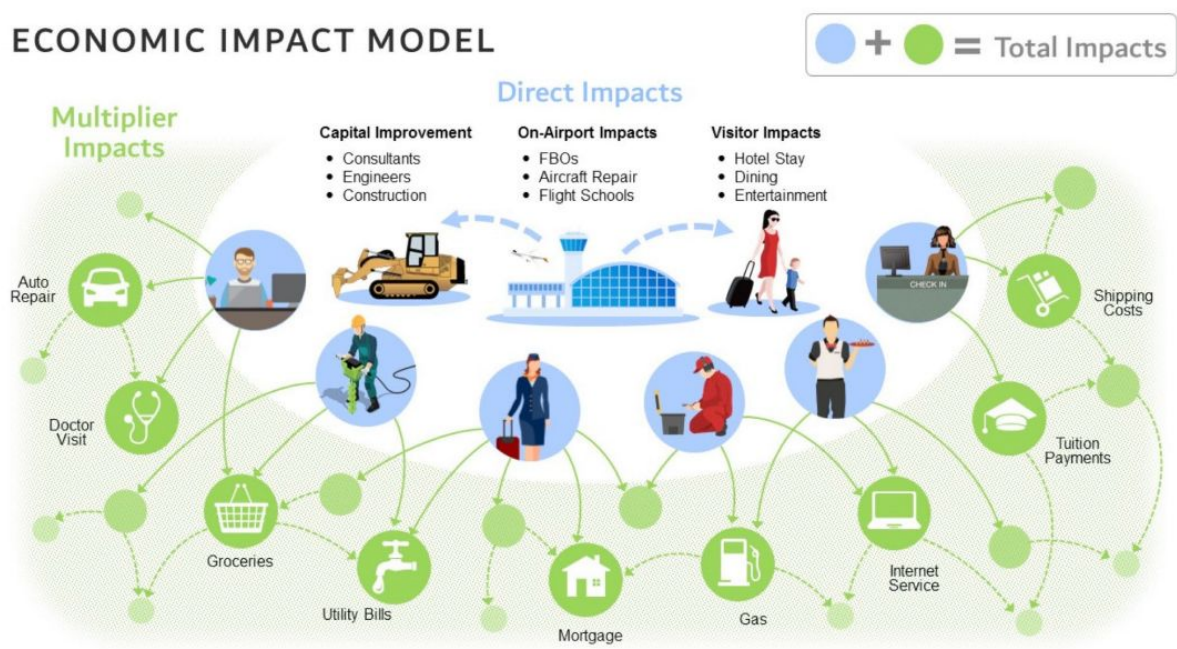
[1] https://drive.google.com/open?id=1dJ7AkTnK-sH3ScrZ5zhGv3FtLkrjfWzs
https://drive.google.com/open?id=16t_1u0dgwUZcvZ_cgl999h2uNA-Hf1pq

[2] https://www.bostonglobe.com/lifestyle/travel/2019/09/04/logan-poised-become-one-busiest-airports-country/0k2zL5MOiueDSQAfahnS2J/story.html

Request for Disclosure of Health Impacts

At 424,024 operations in 2018, the Transportation Security Administration ranks Boston Logan as the 4th fastest growing airport in North America. In 2016, Logan surpassed its historic high level of commercial jet operations, and in 2017 Logan passenger volumes exceeded Massport's previous passenger volume estimate of 38.9 million due in 2030. As Logan aircraft activity and impacts grow, Massport's MEPA disclosure responsibilities should grow. There is now sufficient evidence of substantial regional health impacts of airport related aircraft and vehicular emissions of ultra-fine particulate and other pollution, and noise impacts to warrant that ***EEA require Massport to compile a separate chapter in ESPR and EDR documents which lists and discusses the major research findings around health and airport impacts, presents maps of likely pollution and noise health impacts, and commits the Port Authority to the net reduction of and mitigation of those impacts.*** 8-3



Airport Economic Impact Model Graphic; Source: MassDoT Aeronautics Statewide Airport Economic Impact Study Update 2019

Request for Balanced Economic Benefit Analysis

2017 ESPR cites the 2019 Massachusetts Statewide Airport Economic Impact Study Update released by MassDoT's Aeronautics Division, which reports that the economic impacts of Logan airport exceeded $16.5 billion in 2019. This report, however, was not produced by the staff of the 14 person division, but by CDM Smith, a private consulting firm which used complex and economic multiplier calculations to search for implausibly wide-reaching indirect economic

impacts which for instance credit Logan for a portion of the salary of gas station attendants who put fuel in cars which travel to the airport, or for things such as the utility bills of restaurants at which airport construction workers dine. Notably, CDM Smith was also contracted by the Mass Aeronautics to develop an IT system at a cost of $603,958. Given that within a year of this project's completion in 2016, the system was declared to be deficient for the business needs of the state and abandoned, it is troubling that the Aeronautics Division again entrusted CDM Smith with producing its important Statewide Airport Economic Impact Study Update. We therefore can have no confidence in the inflated positive economic impact benefit claims printed in 2017 ESPR.

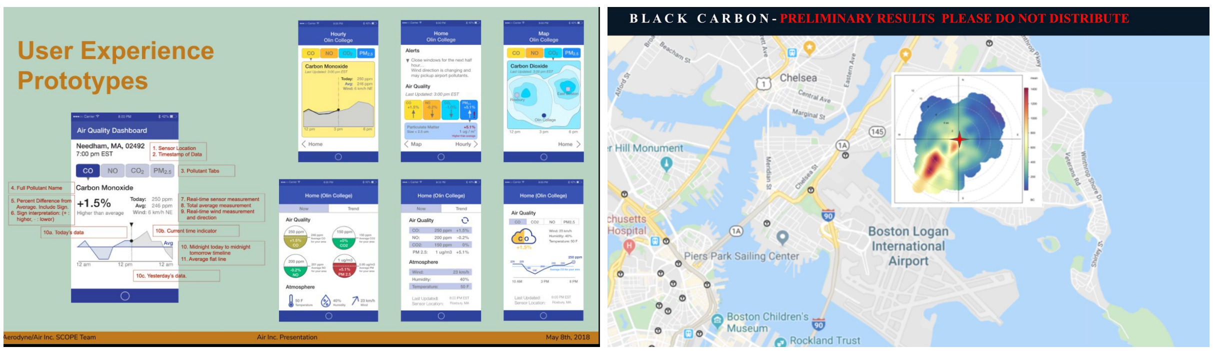
Neither CDM Smith, in this study, nor Massport make any attempt to calculate the economic costs of negative health impacts of airport air and noise pollution exposure, nor of the loss of regional productivity due to traffic congestion which are related directly to Logan Airport. This is an important flaw in the 2017 ESPR economic benefit argument. The World Health Organization estimates that poor air quality causes 7 million premature deaths every year, shortening the lifespan of those who die of stroke, heart disease, chronic obstructive pulmonary disease, lung cancer and acute respiratory infections, by an average of 2.2 years.

Annual Economic Impact of Airport Profile Pollutant Exposure in Eastern Massachusetts

Disease		Annual US Economic Impact	Massachusetts Annual Cost	**3.2% Pollution Factor	Eastern Massachusetts Economic Cost
Heart disease	Source Link	$200,000,000,000	$4,000,000,000	$128,000,000	$96,000,000
Stroke	Source Link	$34,000,000,000	$680,000,000	$21,760,000	$16,320,000
Asthma	Source Link	$80,000,000,000	$1,600,000,000	$51,200,000	$38,400,000
COPD	Source Link	$36,000,000,000	$720,000,000	$23,040,000	$17,280,000
Alzheimers	Source Link	$277,000,000,000	$5,540,000,000	$177,280,000	$132,960,000
Hypertension	Source Link	$51,200,000,000	$1,024,000,000	$32,768,000	$24,576,000
Sleep Interruption	Source Link	$411,000,000,000	$8,220,000,000	$263,040,000	$197,280,000
Obesity	Source Link	$190,200,000,000	$3,804,000,000	$121,728,000	$91,296,000
Cancer	Source Link	$96,000,000,000	$1,920,000,000	$61,440,000	$46,080,000
*Learning disability (ADHD)	Source Link	$206,000,000,000	$4,120,000,000	$131,840,000	$98,880,000
Depression	Source Link	$210,000,000,000	$4,200,000,000	$134,400,000	$100,800,000
Autism	Source Link	$126,000,000,000	$2,520,000,000	$80,640,000	$60,480,000
Total Economic Impact		**$1,917,400,000,000**	**$38,348,000,000**	**$1,227,136,000**	**$920,352,000**
*mean of $143b - $266b range					
**3.2% Source Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6326158/					

Economic Impacts of Health Impairment; Source: AIR, Inc. 2019

In omitting data and analysis of the economic costs of health impairment and lost productivity
due to traffic congestion, <u>2017 ESPR badly miscalculates the total economic impact of Logan</u>
<u>Airport</u>. ***We ask that EEA require that Massport remove any reference to the flawed and***
inaccurate CDM Smith Statewide Airport Economic Impact Study Update and incorporate data
and analyses around the cost of airport related health impairments, lost productivity, reduced 8-4
property values, tax base and rents, and other negative economic impacts into a supplemental
reporting and analysis of the economic impacts of Logan for this ESPR. <u>Such information is</u>
<u>necessary to provide MEPA with a balanced and comprehensive accounting of the positive and</u>
<u>negative economic and social impacts of Logan airport</u>.

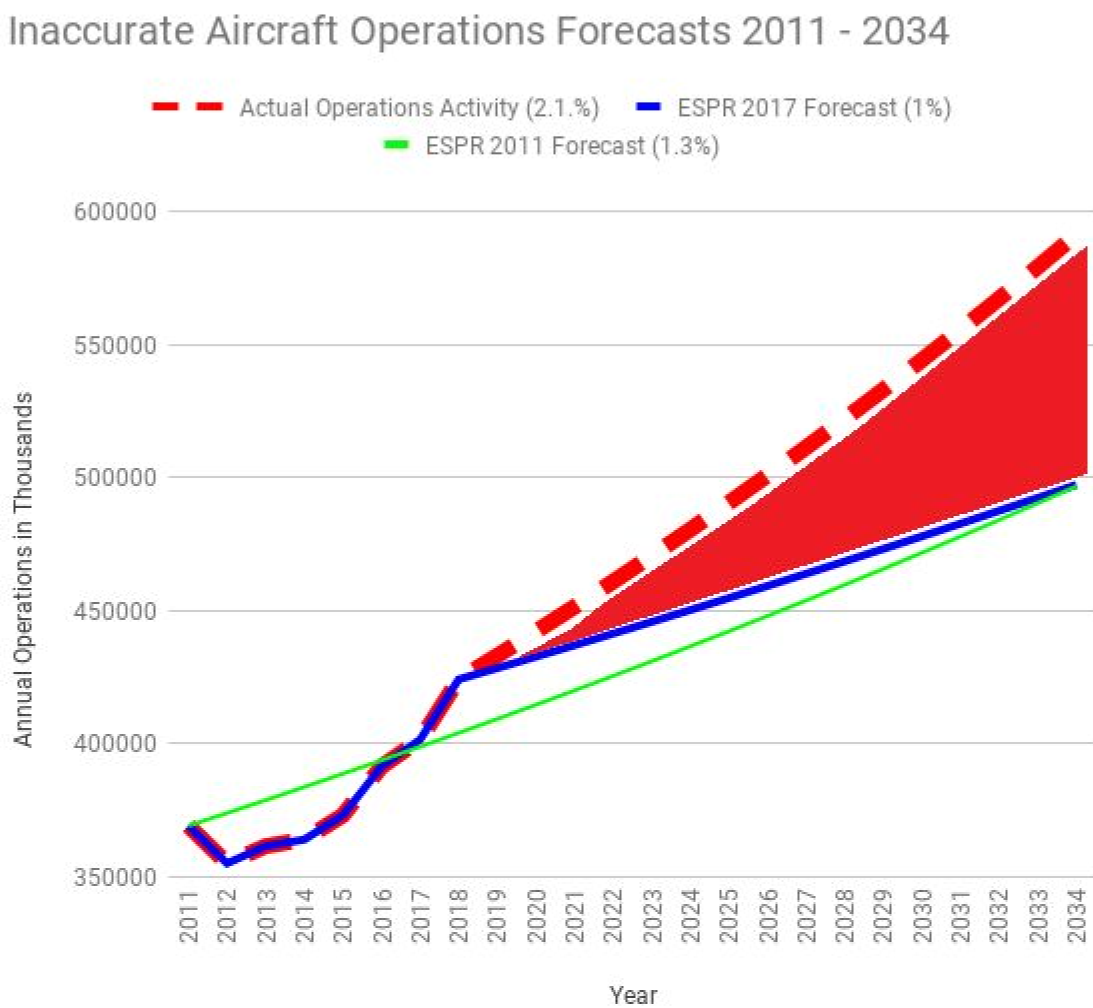


Real-time Pollution Monitoring and Filtration Project Project Slides, Source: Air Partners 2019

Plugging into Innovation

A more collaborative approach would allow Massport to work with local community partners,
and area universities to model noise and pollution related health impacts by census tract,
design updated soundproofing programs, and create new innovations in mitigation for traffic
and air quality impacts such as building the World's first Airport Sponsored In-home Air
Filtration Pilot Project, or becoming the first US airport to create a European style night flying
restriction which protects the region against intrusive and harmful sleep deprivation and all of
the associated health impacts. Such innovations would restore Massport to their former
position as a leader in community engagement and mitigation. ***We ask that EEA use the above***
referenced collaborations and engagement tactics to create a constructive dialogue around
health and develop a list of viable air quality, noise, and traffic mitigation opportunities, policies, 8-5
and strategies.

Regional Transportation Planning

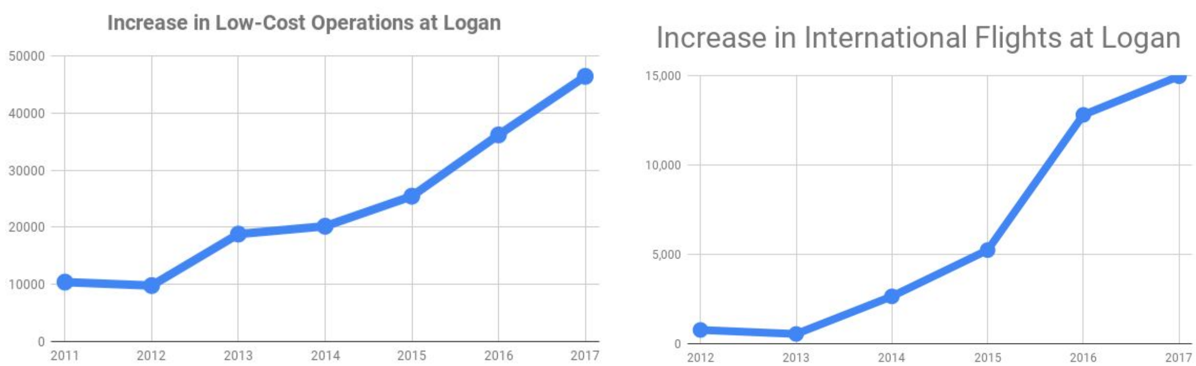


Inaccurate Airport Operational Growth Forecasts. Source: AIR, Inc. 2019

Since 2011 ESPR's release, aircraft activity at Logan has increased by over 40,000 landings and Take-offs. If the 7-Year Average Operational growth Rate of 2.1% per year continues, Logan will handle over 600,000 flights in 2034, the final year of ESPR 2017's stated planning horizon. While Logan's airfield can absorb increases in aircraft volume, the airport's ground access systems are at or above capacity on a daily basis, crashing the city's mobility system. 2017 ESPR offers no discussion of Logan's *regional* landside capacity, leaving MEPA and the public with unanswered questions regarding where to put future increases in traffic congestion which will be more and more rapidly exacerbated by capacity shortfalls. While listing 26 on-airport capacity enhancement projects at Logan, Massport does not commit to addressing the capacity shortfalls of the off airport regional roadway system on which Logan airport relies, and the

capacity of which is consumed daily. ***We ask that EEA require Massport to produce ground access mitigation plans which protect our regional roadway capacity under the High Growth Scenarios requested above.*** 8-6 ***Specifically, we ask EEA to require Massport to model traffic levels under a broader set of alternative policies including vastly expanded Logan Express service including multiple new terminals, increased frequency, additional destinations, a variety of pricing scenarios for remote parking and fares, additional cost-reduction and benefit features such as security line priority and dedicated bus lanes, and well as; completion of the Red to Blue Connector, extension of the Blue Line to Lynn, and Expanded Water Ferry service within the inner harbor and beyond.*** 8-7

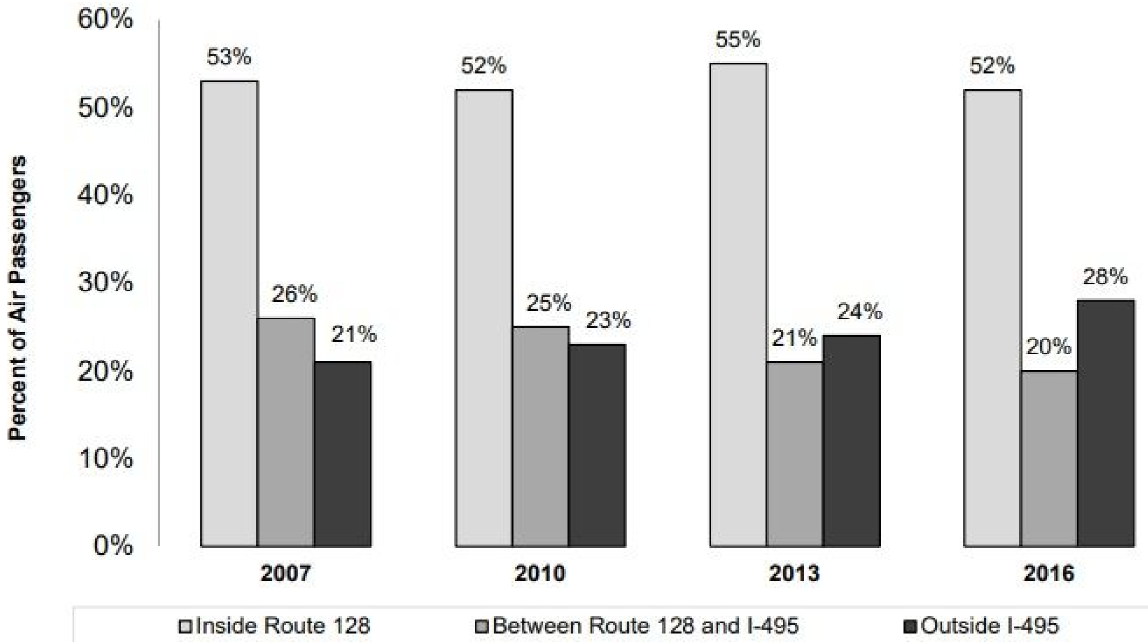
Large Commercial Passenger Jets at Logan 1990 - 2017; Source: AIR, Inc. 2019



Increases in Low-Cost and International Flights at Logan 1990 - 2017; Source: AIR, Inc. 2019

The New England region's 10 regional airports 1.3 million more passengers in 2017 than in 2016. However, during the same period, Logan grew 314% faster. 2107 ESPR does not offer adequate explanation of why Logan grew so much faster than the other airports exposed to the same healthy regional economic conditions. This disparity suggests that Massport's aggressive marketing and capacity building programs such Logan Forward, -<u>not only</u> the strength of the Massachusetts' economy are driving Logan's growth and capacity crisis. Without thorough analysis of the growth and use of regional airports, Massport's ESPR doesn't give MEPA a reasonable assessment of future opportunities to manage regional air travel demand. ***We ask that EEA require Massport to produce economic, traffic and impact modeling which evaluate how changes in landing fee structure, investments in ground access, and other initiatives to increase the share of New England's air travel needs served by regional airports could affect local economic conditions, airline routing, and consumer purchase behavior, as well as their potential to achieve off-loading of flights, to other viable New England Airports, <u>including TF Green and Manchester Boston</u>.*** 8-4

Figure 5-13 Logan Airport Air Passenger Ground Access Trip Origins



Source: Massport, *2004, 2007, 2010, 2013, 2016 Logan Airport Air Passenger Ground-Access Surveys.*
Note: Based on air passengers departing on both weekdays and weekend days.

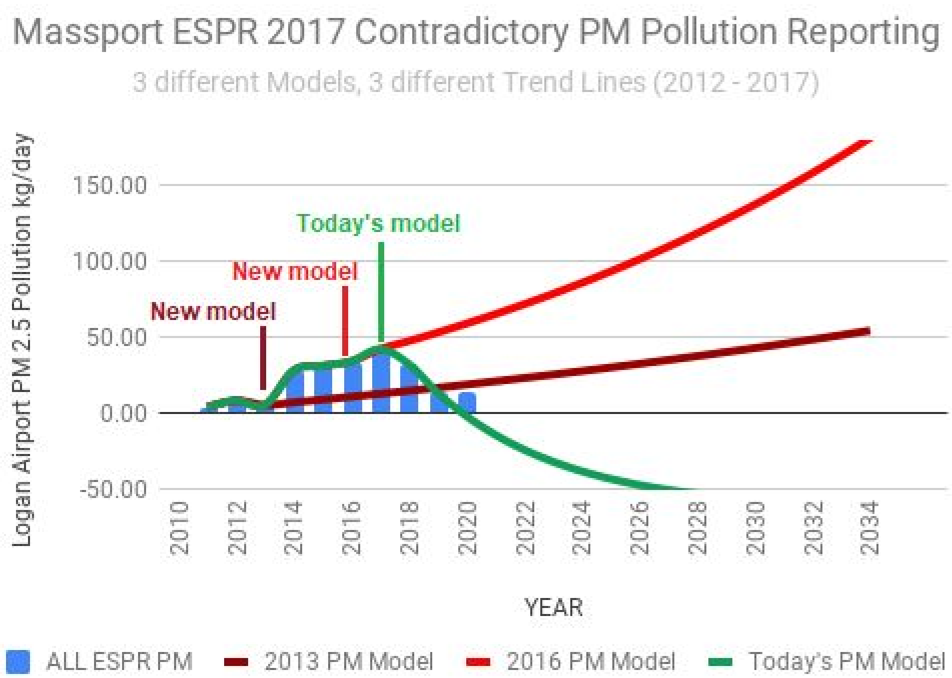
Logan Airport Air Passenger Ground Access Trip Origins; Source Massport

Need for More, Better Ground Access Sooner

Landlocked, and in the middle of Boston's urban core, Logan is choked by constrained highways, yet now it brings over 130,000 passenger cars per day -more than drive to a Bruins, Red Sox, Patriots and Celtics game combined. With HOV mode share stuck at 30% and backsliding recently, continued 5% annual passenger growth at Logan, a 13.9 million annual passenger per year increase can be expected by 2024 when the next ESPR document will be released. This increase represents a 34% increase over today's activity and can be expected to result in 9.7 million more airport bound passenger car trips in 6.5 million more annual trips (assuming an average load factor of 1.5 per passenger car). This increase will push 18,000 more vehicles onto our streets every day.

Logan's Ground Access Passenger Surveys show that Boston's downtown airport is serving a steadily increasing number of travelers from outside 495. While increasing service to Logan may make sense from the airlines' point of view, it is doubtful that it holds any significant economic advantages for the state of Massachusetts over service to Worcester, Hanscom, TF Green, Manchester - Boston, or any other regional airport. Given the disparate negative impacts and capacity issues involved with flying into Logan, 2017 ESPR should evaluate the benefits of a more balanced regional airport system. Improving ground access to Logan, as well as to 8-8

alternative airports could play a significant role in the success of such an initiative. ***EEA should require Massport to develop multiple Remote Terminal Scenarios in which vastly expanded and improved suburban Logan Express facilities can serve as transportation hubs with service to and from not only Logan, but also to and from other regional airports, business centers and downtown***. These Remote Transportation Terminals themselves could have abundant structured parking, rental car facilities, concourses, dining and other amenities, and spark tremendous positive local economic activity. 8-9



Plotting the various PM model outputs; Source AIR, Inc. 2019

Need to Explain PM Data

2017 ESPR does not explain the sharp decrease in PM reported between 2016 and 2017. While listing fleet mix, changes in software and noise indexing, and operational changes as factors, Massport does not provide detailed data on what percentage each of these factors contribute to the overall reduction in PM emissions reported in that period. Assuming a 27 year service life for average commercial aircraft, Logan's fleet is likely to retain over 96% of the same aircraft year over year, so incremental fleet change can only explain a small portion of the 20% reduction in PM emissions reported between AEDT 2c SP2 and AEDT 2d data during that period. Massport also does not supply this MEPA environmental filing with tables and analysis of year to year software outputs which could offer reviewers a means of comparing and understanding the relative growth or reduction of this important pollutant. Thus, 2017 ESPR reporting confounds comprehension of the status and current conditions RE possible impacts of this emissions pollutant through multiple changes in widely varying models.

Table 7-10 Estimated $PM_{10}/PM_{2.5}$ Emissions (in kg/day) at Logan Airport, 2010-2017[1]

Aircraft/GSE Model:	EDMS v5.1.2	EDMS v5.1.3				EDMS v5.1.4.1					AEDT Version 2c SP2		AEDT 2d
Motor Vehicle Model:	MOBILE 6.2.03					MOVES 2010b		MOVES 2014	MOVES 2014a				MOVES 2014b
Year:	2010		2011	2012	2013		2014		2015	2016		2017	
Aircraft Sources													
Air carriers	34	34	35	43	41	48	48	48	53	57	52	36	36
Commuter aircraft	4	4	3	2	2	7	7	7	7	6	4	2	3
Cargo aircraft	3	3	3	3	2	3	3	3	3	3	2	1	1
General aviation	2	2	4	3	3	4	4	4	4	4	2	3	2
Total aircraft sources	43	43	45	51	48	62	62	62	66	70	60	42	43
Ground service equipment[2]	13	13	13	13	12	12	12	12	12	15	15	14	14
Motor Vehicles													
Parking/curbside[3]	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
On-airport vehicles	6	6	6	6	6	14	14	18	16	17	17	18	18
Total motor vehicle sources	6	6	6	6	6	15	14	18	17	18	18	18	18
Other Sources													
Fuel storage/handling[4]	0	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous sources[5]	2	2	3	2	3	3	3	3	3	3	3	2	2
Total other sources	2	2	3	2	3	3	3	3	3	3	3	2	2
Total Airport Sources	64	64	67	72	69	92	91	95	98	106	96	77	77

Source: Massport and KBE, 2019.
Notes: kg/day - kilograms per day. 1 kg/day is approximately equivalent to 0.40234 tons per year (tpy); PM - particulate matter.
Years 2010 and 2013 were computed with previous years' EDMS versions to provide for a common basis of comparison. Years 2013 and 2014 were also computed with the previous years' motor vehicle emission factors models. Year 2017 was computed with current and previous versions of AEDT and MOVES.
1 It is assumed that all PM are less than 2.5 microns in diameter ($PM_{2.5}$). See Appendix I, *Air Quality/Emissions Reduction*, for 2005 to 2009 emission inventory results.
2 Ground service equipment (GSE) emissions include auxiliary power units (APUs) as well as vehicles and equipment converted to alternative fuels.
3 Parking/curbside is based on vehicle miles traveled (VMT) analysis.
4 Fuel storage and handling facilities are not sources of PM emissions.
5 Includes the Central Heating and Cooling Plant, emergency electricity generation, fire training, snow melters, and other stationary sources.

Estimated PN10/PM2.5 Emissions at Logan. Source: Massport

We ask that EEA require Massport to provide supplemental reporting and description regarding PM levels over the period between 2010 and 2017 which provides reviewers with an understanding of the level of growth or decline of this important pollutant, as well as an understandable narrative as to the causes and implications of changes in modeling. 8-2

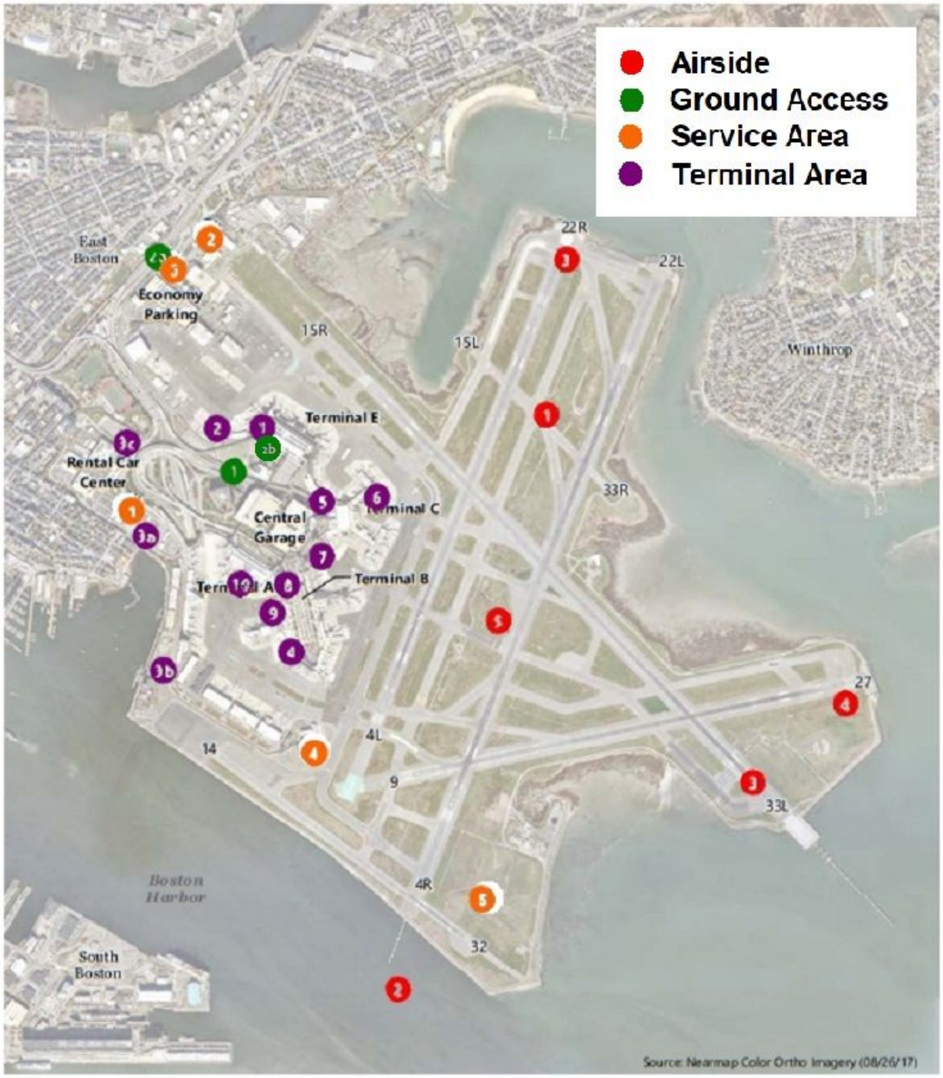
Insufficient Noise Data

2017 ESPR reports that 7933 Logan area residents were exposed to 65 DNL in 2017. 2017 ESPR growth forecasts indicate that Logan will top 486,000 aircraft operations (adding 84,629 operations -a 21% increase) by circa 2032. But over the past 6 years, aircraft activity has increased at more than twice this pace. At this rate, 189,921 more flights (a 47% increase) would be added, leaving a potential 30% expansion (105,292 flights) unaccounted for. In this light, Massport's projected increases in predicted persons within the most severe noise impact zones 65DNL sound contour of 8356 (603 more) are potentially very low. As described above, fleet characteristics do not change rapidly, so noise increases should track closely with operational growth. The 17% increase in operations proposed by Massport could mean 9,282 are enveloped in the most extreme noise, while a 47% increase might add 105,292 additional unaccounted-for flights and leave 11,661 (3,728 more) in the 65DNL, 6 x's higher than the 603 reported. This presents MEPA with a scenario in which it can assume that the massive noise impact backsliding which has occurred throughout this modern era of extreme airport

expansion will continue. While in his Certificate for 2016 EDR, Secretary Beaton required Massport to provide forecasts, and impact and mitigation implementation plans for the next 5 years through 2035 in 2017 ESPR planning and impact sections, we find no evidence of the mitigation submissions RE the next 5 years. Instead, we find lists of noise abatement practice, of which many are inactive or defunct. ***We ask that EEA require Massport to produce noise impact estimates based upon High Growth Scenarios such that MEPA and other noise impacted stakeholders can reasonably assess future noise impacts.*** 8-3

Missed Opportunity

Having a Functional Runway Use Program would allow Masport to play a constructive role in noise grievance engagement in all localities. Logan's former Runway Use Program, known as the Preferential Runway Advisory System (PRAS) balanced a complex set of runway selection criteria with noise abatement goals of limiting time overflight above communities and distributing noise evenly on a population weighted impact basis. Massport committed to updating PRAS in the Logan Airside Improvements Planning Project – EEA #10458 and in an FAA Final Environmental Impact Statement (Final EIS) and ROD in August 2002. However this update was never subsequently completed. To make PRAS fully functional, when updated, it should also be converted to a FORMAL RUP. ***We ask that EEA require Massport to update PRAS to reflect current population-weighted impacts which incorporate changes in annual flight patterns which have occurred over the past 25 years.*** ***As part of an effective Runway Use Program, <u>flight paths must be spread out fairly and the incredibly damaging RNAV navigation systems which create devastating sky-highways must be split up into multiple routes, giving much needed respite to the towns below</u>.*** 8-10



Graphic 2: Combined Massport Logan Airport Capacity Enhancement Projects, Source AIR, Inc. 2019

End Project Segmentation

https://www.airport-technology.com/projects/boston-logan/

The above article, written circa 2009 and posted at airport-technology.com recognizes a 'Logan Upgrade and Expansion Programme' underway as of 1994 at a cost of 4.4 B, entailing over 400 projects. More recently, the CONRAC, Logan Parking and Terminal E Modernization, and a series of other terminal and roadway projects have clearly been conjured up to serve the needs of a 65% increase in passengers over the past 10 years, and similar increases over the next decade. By submitting parking, terminal, airfield, and roadway projects, not as part of a coordinated masterplan, but as separate stand-alone projects, Massport is employing a classic environmental segmentation strategy. In so doing, Massport benefits by

displacing analysis of environmental impacts from the Project Massachusetts Environmental Policy Act (MEPA) review where EIR's could meet resistance, into future non-project related MEPA processes. 2017 ESPR lists 26 separate projects planned or underway at Logan. Among the projects under separate MEPA review listed at Massport's Environmental Filings web page[3] are:

- The Logan Airport Parking Project
- The Terminal C Canopy, Connector and Roadway Project
- The Terminal B Optimization Project
- The Terminal E Renovation and Enhancement Project
- The Logan Airport Renovations and Improvements at Terminals B & C/E Project
- The Terminal E Modernization Project, and
- The Terminal E Renovations and Enhancement Project

MGL c. 30, section 61 establishes the state's authority to regulate environmental impacts of airport projects through Massachusetts Environmental Policy Act (MEPA) review. Since environmental impacts accumulate incrementally, this allows EEA to consider projects in contexts and to act to avoid segmentation. ***We ask EEA to evaluate all Logan capacity enhancement project together and review component project environmental impact contributions in project EIRs.*** 8-6

Conclusion

Nothing which is bad for the health of our families is *good* for our economy, or for Logan Airport. While Logan is bursting at the seems and clearly cannot handle the region's future growth needs alone due to regional roadway capacity constraints, a system of regional airports could easily handle millions of additional passengers while reducing traffic, noise and air pollution impacts on Massachusetts communities. 2017 ESPR does not explain why they have not pursued this option.

Massport has committed to updating PRAS, our Runway Use Program -but has not acted upon that commitment. Massport has not pursued available options to establish night flying restrictions, conduct additional soundproofing or provide air filtration for local impacted communities. Massport promotes driving to Logan by offering free curbside pick-up and drop-off, free cell phone lots and some of the least expensive short term parking rates of any major urban airport.

Without Massport leadership, we will not increase HOV mode share to the 60 - 70% levels needed to reduce our airport's traffic burdens. Without Massport interest in and effort to improve noise outcomes, we will not avoid the spread sleep interruption across our region. Without Massport, we will not establish a leadership position on airport pollution mitigation.

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[3] https://www.massport.com/logan-airport/about-logan/environmental-reports/

We are at a critical juncture in transportation planning in the state. And Boston area families cannot continue to look the other way while noise and air pollution, and traffic rise. Massport must embrace the many challenges they face and rededicate themselves to excellence in environmental impact disclosure, planning and mitigation.

AIR, Inc. has been pressed into service as a critic of 2017 ESPR -work which we believe is an unfortunate way to expend valuable public engagement. We would much rather partner with Massport, EEA, CLF, and others in developing innovations in community engagement which can light a new path to health growth for our region for decades to come.

Sincerely,

Chris Marchi, Vice President; Airport Impact Relief, Incorporated (AIR, Inc.)

Airlines for America®

We Connect the World

July 26, 2019

Submitted via: email to page.czepiga@state.ma.us

The Honorable Kathleen Theoharides
Secretary Executive Office of Energy and Environmental Affairs
Attn: MEPA Office Page Czepiga
100 Cambridge Street, Suite 900, Boston, Massachusetts 02114

Re: Airlines for America Comments on *Draft Environmental Impact Report / Environmental Assessment EEA# 15665 – Logan Airport Parking Project*

Dear Ms. Theoharides:

Airlines for America ("A4A") appreciates this opportunity to comment on the *Draft Environmental Impact Report / Environmental Assessment EEA# 15665 – Logan Airport Parking Project* ("Draft EIR/EA"). A4A is the principal trade and service organization of the U.S. airline industry.[1]

Together with our members we are pleased to support strongly the Logan Airport Parking Project (the "Project"), which will bring critically needed parking capacity to Boston Logan International Airport ("BOS") while also providing important regional air quality benefits. This type of project aligns with the commercial aviation industry's commitment to providing safe, reliable commercial air service that is a critical engine of strong, environmentally sustainable economic growth.

Our commitment to the environment has extended to working with various entities to establish well thought out, reasonable programs that achieve air emissions reductions from airport ground support equipment ("GSE"). Indeed, many of our carriers already have been working closely with Massport to convert GSE to alternatively-fueled, low-emission equipment where practicable and we look forward to working with Massport to develop an airport-wide program at BOS. We note, however, that because the Project itself provides air emissions benefits, it does not generate a need or requirement to mitigate air emissions. As such, it is very important that the Final EIR/EA explicitly states and clarifies that GSE-related programs to reduce emissions are <u>not</u> required to mitigate air emissions associated with the Project and/or to demonstrate conformity with the State Implementation Plan ("SIP) pursuant to Section 176(c) of the Clean Air Act. In addition, as detailed below, we respectfully request that the *Draft Project § 61 Findings for the Parking Project at Boston-Logan International Airport* (as presented in Appendix C of the Draft EIR/EA), be amended to reflect that any GSE program will be voluntary and exclude any provision relating to commercial aircraft taxiing. 9-1

BACKGROUND

A4A's members have a strong environmental record and demonstrated commitment to sustainable aviation growth. In fact, although the U.S. airlines contribute less than two percent to our nation's greenhouse gas emissions ("GHG") inventory, we take our role in controlling GHG emissions very seriously. Between 1978 and year-end 2018, the U.S. airlines improved their fuel efficiency by more than 130 percent, saving nearly 5 billion metric tons of carbon dioxide ("CO_2"), equivalent to taking 26 million

[1] A4A's members are: Alaska Airlines, Inc., American Airlines, Inc., Atlas Air, Inc., Federal Express Corporation, Hawaiian Airlines, JetBlue Airways Corp., Southwest Airlines Co., United Airlines Holdings, Inc., and United Parcel Service Co. Air Canada, Inc. is an associate member.

cars off the road each of those years. And, they carried 42 percent more passengers and cargo in 2018 than they did in 2000, while emitting just 3 percent more CO_2.

At the same time, commercial aviation drives our national, state and local economies. At the national level, the commercial aviation industry drives more than $1.5 trillion in economic activity and 10 million jobs. A very recent study from the Massachusetts Department of Transportation[2] concluded that in 2017 the State's public-use airports generated $24.7 billion in economic output and supported over 199,000 jobs ($7.2 billion in payroll). The critical role aviation has played in driving economic prosperity and growth in Massachusetts is evidenced by the fact that aviation's contribution to total output has increased 49 percent (nearly $3 billion) since just 2013. BOS has contributed the vast majority of these benefits, accounting for over $16.3 billion in economic output and employing 162,262 ($5.97 billion payroll) in 2017.

The U.S. airlines have achieved this level of simultaneous economic and environmental performance through relentless pursuit and implementation of technology, operational, and infrastructure measures to minimize our environmental impact. And we are committed to accelerating the pace of progress. U.S. commercial airlines are active participants in a global aviation coalition that has committed to 1.5 percent annual average fuel efficiency improvements through 2020 and carbon neutral growth from 2020, subject to critical aviation infrastructure and technology advances achieved by government and industry, with an aspirational goal of a 50 percent reduction in CO2 by 2050 relative to 2005 levels. Our primary focus is on getting further fuel efficiency and emissions savings through new aircraft technology, sustainable aviation fuels and air traffic management and other operational and infrastructure improvements.

With respect to GSE and the ability of carriers to replace or convert equipment, several points need to be emphasized. First, we strongly support the development of well thought out, reasonable GSE programs that achieve air emissions reductions. Indeed, our members have worked closely with Massport and other airports to replace and/or convert GSE to low-emission equipment where practicable. Some recent examples include:

- Last year, BOS and American Airlines worked together to create a $2.5 million project to electrify GSE. The Federal Aviation Administration ("FAA") awarded BOS a $1,880,335 grant which, together with the required local match of $626,778, was used to fund installation of 50 electric chargers – these chargers are to be used to serve 99 units of electric GSE ("eGSE") that, in support of the grant, American Airlines committed to acquire at a cost of approximately $3 million.[3] Subsequently, the U.S. Environmental Protection Agency ("EPA") awarded Massport a DERA (Diesel Emissions Reduction Act) grant help fund the replacement of 15 diesel baggage tractors, 7 diesel belt loaders and 3 diesel push back tugs (for smaller regional jets), costing a total of $1.2 million. The $541,817 grant covered 45 percent of costs; the 55 percent of required matching funds ($662,221) was provided by airlines.

- In fiscal year ("FY") 2013, BOS received a $2,000,000 VALE grant to fund installation of eight electric-powered gates, which enabled use of gate-supplied pre-conditioned air (eliminating the need to operate diesel-powered air conditioning units) and gate-supplied power to aircraft (eliminating the need to operate diesel-powered ground power units ("GPUs")).

- Similarly, in 2018 JetBlue (which also has a major presence at BOS) partnered with the Port Authority of New York and New Jersey ("PANYNJ") to secure VALE funding to convert 116 baggage tugs and belt loaders from diesel- and gas-powered models to eGSE at John F. Kennedy International Airport ("JFK"). The lion's share of the required

[2] The MassDOT study is available here: https://www.mass.gov/economic-impact-study.
[3] American committed to replacing 66 units by 2020 (34 diesel bag tractors, 9 diesel belt loaders, 8 gas bag tractors, 13 gas cargo tractors and 2 gas belt loaders), 18 gas bag tractors by 2021, and 15 diesel belt loaders by 2022. American also indicated it would replace 16 diesel push back tractors (for regional and single-aisle aircraft) by 2026, but the $752,134 cost of the 16 chargers needed to serve these units was not covered by the VALE grant.

$1,324,438 in local matching funds was provided by JetBlue in the form of an agreement to acquire the eGSE. The $3,973,316 FAA grant to PANYNJ funded the installation of 38 charging stations (housing 120 chargers). In addition the New York Power Authority provided $200,000 in technical and financial assistance to the PANYNJ.

Importantly, as the above examples illustrate, the success of these efforts depended on securing funds from the FAA's VALE Program,[4] which requires that any emissions reductions be surplus to mandated reductions.[5] Like VALE, emission reductions funded through DERA must be voluntary (i.e., may not be "used to fund emission reductions mandated under Federal, State or local law." 42 U.S.C. § 16132(d)(2)). In other words, the success of these efforts depended on the <u>voluntary</u> nature of the effort.

Second, GSE is critical to safe, reliable and efficient aircraft operations and any GSE program that has the effect of compromising the safety of aircraft operations or unduly constraining aircraft operations is preempted by Federal aviation laws.[6] For example, aircraft deicing is essential to ensuring the safety of passengers and crew during aircraft operations in winter conditions – any mandate to electrify deicing trucks unless and until such trucks were available and able to deice aircraft in a manner conforming to FAA's rigid safety requirements and as efficiently as traditionally-fueled equipment would be preempted.[7] Further, it is without question that the FAA exercises exclusive and plenary authority over the operation of aircraft and FAA regulations unequivocally provide that "[t]he pilot in command of an aircraft is directly responsible for, and is the final authority as to, the operation of that aircraft." 14 C.F.R. §91.3. Accordingly, the pilot in command exercises final authority as to how and under what circumstances the aircraft will be taxied, authority that cannot be usurped by State, local or other authorities.

Third, as a general matter it is important to understand that GSE is not a uniform, monolithic category of equipment – rather, GSE is comprised of roughly 23 separate categories of equipment ranging from baggage loaders and baggage tugs to large cargo loaders, aircraft tractors and GPUs. Equipment can vary significantly even within these categories. For example, the performance requirements of aircraft tractors designed for regional jets differ significantly from those designed for larger single-aisle aircraft and those differ significantly from tractors designed for still larger twin-aisle aircraft. Notably, electric alternatives do not exist for many aircraft tractors capable of towing larger twin-aisle aircraft. Similarly,

[4] VALE grants are funded through the FAA's Airport Improvement Program ("AIP"), which in turn is funded predominately by taxes and fees imposed on air carriers and passengers, or through Passenger Facility Charges ("PFCs"), which are FAA-approved local taxes assessed by airport operators on airline passengers (airlines are required to collect PFCs and remit the proceeds to the taxing authority).

[5] Emissions reductions are "surplus" if they are "not otherwise required by Federal, State or local regulations." *See* Guidance on Airport Emission Reduction Credits for Early Measures Through Voluntary Airport Low Emissions Programs (USEPA, September 2004) at 12.

[6] The Federal Aviation Act establishes "a uniform and exclusive system of federal regulation" of aircraft operations to be administered by the FAA. *Burbank v. Lockheed Air Terminal, Inc.*, 411 U.S. 624, 639 (1973). *See also Abdullah v. American Airlines, Inc.*,181 F.3d 363, 370 n.10 (3d Cir. 1999) (aviation regulation is an area where "[f]ederal control is intensive and exclusive") (quoting *Northwest Airlines, Inc. v. Minnesota*, 322 U.S. 292, 303 (1944)). Congress has affirmed repeatedly its intent that this system of federal regulation maintain the primacy of safety and accommodate, to the maximum extent possible, demand for air transportation. *See e.g.* 49 U.S.C. § 40101(a) ("[T]he Secretary of Transportation shall . . . (1) assign[] and maintain[] safety as the highest priority in air commerce.") Congress also has affirmed the need to meet environmental objectives consistent with maintaining safety and ability of the National Airspace System ("NAS") to accommodate the needs of the nation's economy and culture. *See,* § 47101(a) ("It is the policy of the United States – . . . (6) that airport development projects under this subchapter provide for the protection and enhancement of national resources and the quality of the environment in the United States."). It is without question, however, that the FAA wields primary and exclusive jurisdiction over air safety and the operation of the NAS. *See,* 49 U.S.C. §40103(b): "The Administrator of the [FAA] shall develop plans and policy for the use of the navigable airspace and assign by regulation and order the use of the airspace necessary to ensure the safety of aircraft and the efficient use of airspace." This pervasive federal regulatory scheme extends to both aircraft in flight and aircraft-related operations on the ground. *See, e.g.*, 49 U.S.C. § 40103(b)(2)(B)-(C); *Burbank-Glendale-Pasadena Airport Authority v. City of Los Angeles*, 979 F.2d 1338, 1341 (9th Cir. 1992) (Federal Aviation Act preempts any regulatory "interference" with the operations of aircraft on the ground); *City of Houston v. FAA*, 679 F.2d 1184, 1195 (5th Cir. 1982) (FAA has regulatory authority "not only [over] the corridors of air traffic, but the use of airports as well").

[7] *See also* USEPA Final Rule, Effluent Limitations Guidelines and New Source Performance Standards for the Airport Deicing Category, 77 Fed. Reg. 29168 (May 16, 2012) at 29177 (USEPA declines to mandate use of specific technologies at space-constrained airports like BOS because it was "unable to develop regulatory requirements that would give airports the flexibility they need to avoid significant operational issues and delays"); at 29178-79 (technology mandates inappropriate where they may "lead to unacceptable safety concerns" and ". . . EPA agrees that delays must be a factor in considering today's possible requirements and recognizes that such delays fundamentally affect U.S and international business and recreational interests").

the performance requirements of cargo loaders designed for loading the lower deck of passenger and cargo aircraft differ significantly from the performance requirements of loaders designed to load the upper deck of large, cargo aircraft. Again, electric alternatives do not exist for this latter category.

A couple of important points flow from these observations. First, the already comparatively small market for GSE is comprised of many even smaller sub-categories of equipment that themselves are comprised of even smaller sub-categories. As a result, manufacturers have not invested heavily to develop GSE alternatives and have limited production runs. In fact, many GSE categories are not available "off-the-shelf"; rather, carriers must place special orders for equipment and wait significant periods for delivery. In other words, some types of GSE are not "commercially available" in alternatively-fueled models, including electric models. In addition, even where GSE can be purchased on the market, certain types often are not "commercially available" as that term is commonly understood (i.e., readily available "off-the-shelf").

It also important to appreciate that, even if "commercially available" in alternatively-fueled models, including electric, this is not sufficient to establish that such GSE can be successfully deployed. For example, the infrastructure necessary to support such equipment must already be in place. With respect to eGSE, this means that off-airport utilities must be able to generate sufficient power to support such electrification and the required on-airport infrastructure (which typically is controlled by the airport) must be in place to support deployment of eGSE (e.g., sufficient on-airport substations, conduits and charging stations). Unless and until such infrastructure is put in place by those responsible for providing it, eGSE simply cannot be deployed. In this context, we reemphasize that aircraft cannot operate without GSE. In the event of power failures (resulting, e.g., from natural disasters such as Superstorm Sandy) aircraft operations would come to a halt unless there is sufficient, reliable back-up generation capacity and/or non-eGSE equipment is on hand to service aircraft. Airports and aircraft operations are critically important to facilitating emergency response in the wake of such disasters. It is thus critically important to consider the potential ramifications of relying exclusively on electricity to support aircraft operations and tailor eGSE policies accordingly.

Moreover, the configuration of the airport and nature of operations at the airport must be amenable to the operation of eGSE. For example, sufficient space must be available to install chargers and accommodate parking positions for eGSE while charging. In addition, even if eGSE is ostensibly available on the market, it must be capable of performing the required task at the airport in question. For example, if distances are too great or significant grades must be traversed, eGSE may not be capable of performing the tasks required of it. Such matters must be carefully considered and analyzed before reaching any conclusion regarding the feasibility of deploying eGSE by a certain date.

Finally, it is important to remember that GSE is highly specialized equipment and – especially for larger equipment categories like cargo loaders, aircraft tractors, GPUs and air starts – require very significant investment. In addition, the useful life of GSE is generally quite long and, for some types that are used relatively infrequently (such as air starts) is still longer. Significant expenditures for conversion of GSE before they have attained their useful life could impact the resources available to airlines to make positive investments in new aircraft and other advanced technology. Any turn-over requirement must carefully consider these factors by, for example, ensuring such requirements do not apply to newer units and providing low-use exemptions where conversion to eGSE is not cost-effective.

<u>COMMENTS</u>

With that background, we respectfully provide the following comments.

As an initial matter, as highlighted above, we note that the EIR/EA repeatedly emphasizes that the Project results in air emission <u>benefits</u>. This is true with respect to both emissions of criteria pollutants (relevant to local air quality) and greenhouse gases ("GHGs") and, in both cases, the EIR/EA explicitly notes that this obviates the need for a "Build-with-Mitigation Scenario."[8] In addition, the EIR/EA concludes that

[8] *See* EIR/EA, at 4-52 (concluding "[a]s the Build Condition is anticipated to reduce regional pollutant emissions, a Build-with-Mitigation scenario is not required by the SIP" and including Table 4-15, detailing reductions of Volatile Organic Compounds

increased emissions of criteria pollutants fall below *de minimis* thresholds for triggering a General Conformity determination pursuant to Section 176(c) of the Clean Air Act (i.e., an analysis demonstrating that the Project conforms to the SIP). Notably, the reductions in VOC and NOx resulting from the Project far exceed any peak-year emissions of these pollutants. Accordingly, we submit that the Final EIR/EA and *Final Section 61 Findings* must include language that explicitly clarifies that GSE-related programs to reduce emissions are not required to mitigate air emissions associated with the Project. We also are particularly concerned that as presently phrased, the *Section 61 Findings* could be deemed to create a local mandate to implement the eGSE program, thus disqualifying Massport and airlines from accessing funding sources such as VALE and DERA that – as illustrated above – have been critical to achieving early emissions reductions at BOS through electrification of GSE. Because the Draft EIR/EA itself establishes that there is no need to reduce GSE (or any) emissions to allow the Project to go forward and any mandate to reduce emissions from GSE would preclude both Massport and airlines from accessing significant sources of funding to accelerate the deployment of low-emission and/or eGSE, if the *Final Section 61 Findings* document addresses GSE, it should provide for the development of a voluntary GSE program.

9-1

In addition, while we appreciate the recognition that alternative GSE must be "commercially available" as a predicate to any requirement to convert or replace GSE, the *Final Section 61 Findings* must recognize that "commercial availability" alone is not sufficient to establish the viability of deploying eGSE. The *Final Section 61 Findings* must acknowledge that any mandate to deploy eGSE must also be predicated on findings that (a) sufficient infrastructure is in place to accommodate and support such equipment and (b) operation of eGSE is viable as a practical matter (i.e., that it is capable of performing the tasks of the equipment it will replace without compromising the safety and efficiency of aircraft operations). The *Final Section 61 Findings* also must acknowledge that it is inappropriate to require the turnover of "all" GSE by any date certain, even if all of these predicates are met, without first evaluating and analyzing the cost-effectiveness of converting or replacing equipment before its useful life has been attained. Moreover, the *Final Section 61 Findings* must recognize that any reasonable policy regarding the replacement of GSE will include reasonable exceptions for low-use equipment.

9-2

With respect to "commercial availability," the *Final Section 61 Findings* also must acknowledge that this can be a difficult concept to define with respect to GSE. As such, before establishing any policy specifying the scope and schedule for replacing GSE, "commercial availability" must be carefully defined.[9] Such a definition must acknowledge that "commercial availability" necessarily requires that the equipment is available at a commercially reasonable price. In addition, the process and criteria must also be defined for determining whether (a) specific equipment is "commercially available," (b) sufficient infrastructure is in place to support deployment of eGSE, (c) the eGSE in question can be practically operated at BOS and (d) conversion of GSE to eGSE is cost-effective.[10]

In sum, such factors and considerations need to be carefully evaluated and taken into account whenever an airport is developing a program to achieve air emissions reductions from GSE. Here, where it is explicitly recognized that this Project generates air emission benefits and there is no legal or practical need to mitigate air emissions to enable the Project to go forward, it is arbitrary and capricious to include a mandatory eGSE program as part the *Section 61 Findings* supporting the Project.

("VOCs") and oxides of nitrogen ("NOx")); EIR/EA at 4-64 (concluding "[a]s the Build Condition is anticipated to reduce regional pollutant emissions, a Build-with-Mitigation scenario is not required under the *MEPA Greenhouse Gas Emissions Policy and Protocol*" and including Table 4-20 tabulating the reductions in CO2 generated by the Project).

[9] We note that the Draft EIR/EA itself characterizes the GSE program in a way that apparently confuses the concept of commercial availability: "Massport is also working with the airlines and other tenants at Logan Airport to convert commercially available ground service equipment to electric power." Draft EIR/EA at 3-32 and 5-13. We assume these statements are intended to read: "Massport is also working with the airlines and other tenants at Logan Airport to convert ~~commercially available~~ ground service equipment to electric power where commercially available." The Final EIR/EA must also acknowledge "commercial availability" of eGSE alone is insufficient to establish the viability imposing an eGSE mandate as detailed elsewhere in these comments.

[10] We note that, in this context, it is particularly important to consider these factors with specific reference to their potential impact on air cargo carriers. As reflected in the conclusions that this Project will generate air emission benefits because it will reduce vehicle miles traveled by "would-be-parkers" and "it reduces the number of vehicles traveling by drop-off/pick-up mode and associated regional VMT" (EIR/EA at 4-49), the Project will predominately facilitate activities of passengers. However, the proposed eGSE program will impose costs and burdens on both passenger and cargo carriers. It is incumbent upon Massport to consider carefully how such a program will impact air cargo carriers given that it does not appear the Project will benefit them directly.

Finally, we unequivocally oppose the assertion in the *Draft Section 61 Findings* that “Massport will ensure that at least 60 percent of commercial aircraft taxiing for re-positioning will be done by electric tugs by 2027.” First and foremost, as emphasized above, the FAA exercises exclusive and plenary authority to regulate the operation of aircraft and has promulgated regulations establishing that the pilot-in-command of an aircraft has direct responsibility for and final authority as to the operation of the aircraft. As such, there is no legal means available to either impose or enforce such a taxiing requirement. For this reason alone, it must be removed from the *Final Section 61 Findings.* In any event, “aircraft taxiing for re-positioning” is not a recognized concept and would need to be defined before any policy to regulate this activity was established (it appears the phrase refers to a subset of aircraft taxiing, but it is unclear which taxiing activities constitute “re-positioning” and which do not). In addition, the fleet operating at BOS could change by 2027 to include a significant number of large, twin-aisle aircraft: today such aircraft cannot be towed using eGSE and this may remain the case in 2027. So, even if legally viable (which it is not) this requirement would require further evaluation before being formally adopted in the *Final Section 61 Findings.*

*****

A4A and its airline members are grateful for the opportunity to provide these comments. We will be very pleased to work with Massport to develop a well thought out, reasonable program that achieves air emissions reductions from GSE. In the meantime, we ask that the *Final EIR/EA* and *Final Section 61 Findings* reflect our comments and proposed changes.

Please do not hesitate to contact us should you have questions or wish to discuss our comments in greater detail.

Sincerely,

Tim A. Pohle
Senior Managing Director
Environmental Affairs
Airlines for America

Boston Logan International Airport 2018/2019 EDR

Energy & Environmental Affairs
Public Comments Portal

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View Comment

Comment Details

EEA #/MEPA ID*
3247

Comments

Submit Date
11-18-2019

Review Due By
11-25-2019

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Status
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Comments

Topic: Comments of Airlines for America

Thank you for the opportunity to provide comments on the Boston Logan International Airport 2017 Environmental Status and Planning Report (BOS2017ESPR). These comments are directed at and limited to a single, very limited aspect of the BOS2017ESPR, specifically the "initiative" to "replace gas- and diesel-powered ground service equipment (GSE) with electric equivalents by the end of 2027, where commercially available." Accordingly, these comments do not address any other aspect of the BOS2017ESPR and A4A specifically reserves the right to address (or oppose) any program, initiative, measure, or other aspect addressed in the BOS2017ESPR in any other forum as appropriate. In addition, we note that the BOS2017ESPR does not and could not establish any specific, enforceable requirement affecting GSE and should Massport or another local, state or any other authority seek to implement the GSE electrification initiative through such a requirement this would require formal proceedings providing interested parties with adequate notice and opportunity

to comment. Earlier this year, A4A submitted comments on the "Draft Environmental Impact Report / Environmental Assessment EEA #15665 - Logan Airport Parking Project." In those comments, we! expressed our general support for initiatives aimed at reducing GSE emissions and our commitment! to working with Massport to achieve its emission reduction goals through reasonable, well-structured GSE programs. We also identified and discussed at length the many considerations!beyond "commercial availability" that must be taken into account when implementing any effort to!electrify GSE. We attach those comments here and respectfully request that they be included in the!record and considered in relation to the GSE electrification initiative identified in the!BOS2017ESPR. With best regards, Tim A Pohle, Senior Managing Director, Environmental Affairs,!Airlines for America 9-3

Attachments

A4A Comments re BOS Parking Project DEIR-EA 2019_07_26.pdf

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November 18, 2019

Secretary of Energy and Environmental Affairs
Executive Office of Energy and Environmental Affairs
EEA # 3247
Attention Anne Canaday, anne.canaday@mass.gov
100 Cambridge Street, Suite 900
Boston, MA 02114

Subject: Boston Logan International Airport 2017 Environmental Status and Planning Report

Dear Secretary Theoharides:

On behalf of the Conservation Law Foundation (CLF) and its members,[1] I am providing our comments regarding the Massachusetts Port Authority's (Massport) Boston Logan International Airport 2017 Environmental Status and Planning Report (ESPR).

Preliminary Statement

The ESPR is a plan for next ten to fifteen years focused on Logan's facility operations, planning for future conditions, and anticipated environmental mitigation commitments. The credibility of the ESPR's analysis and conclusions is utterly bound up with the strength and plausibility of the underlying growth assumptions. CLF's central concern is that the ESPR growth assumptions are understated, implausible, and inconsistent with other reference points that are publicly available to us. This is especially concerning because Logan's actual growth far exceeded the predictions of its 2011 ESPR.

10-1

Given that growth is a primary driver of public health and environmental impact, and consequently will determine the scale of Massport's obligations and opportunities to avoid, minimize, and mitigate environmental harm, CLF submits that the ESPR should be withdrawn and revised to include more realistic growth scenarios, including a scenario in which the rate of

[1] CLF is a nonprofit, member-supported, regional environmental organization working to conserve natural resources, protect public health, and promote thriving communities for all in the New England region. CLF protects New England's environment for the benefit of all people. We use the law, science and the market to create solutions that preserve our natural resources, build healthy communities, and sustain a vibrant economy. We are working to cut pollution from our cars and trucks, create alternatives to driving, and push for more affordable and equitable public transit options across New England.

growth equals that of recent years, while addressing other deficiencies recited in our detailed comments below. 10-1

Detailed Comments

CLF and Massport share and have worked collaboratively to achieve the goal of reducing overall environmental, emissions, and traffic impacts resulting from Logan Airport operations, as documented in a 2017 agreement between Massport and CLF relating to Massport's parking freeze (Massport-CLF Agreement). CLF offers these comments regarding Massport's ongoing and planned initiatives to minimize and mitigate public health and environmental impacts with the goal of strengthening the ESPR to best reflect passenger growth and the necessary mitigation.

In addition to allowing for 5,000 new parking spaces, the Massport-CLF Agreement includes several measures to encourage High-Occupancy Vehicle (HOV) travel to and from Logan Airport. CLF's review of the ESPR considers how the obligations of the Massport-CLF Agreement are reflected within the document.[2] The comments also concern Massport's forecasted passenger and aircraft operations activities and consequential future environmental impacts.

A. The ESPR understates Logan's likely passenger and aircraft operations growth and should include analysis of more realistic passenger growth estimates.

In managing growth at Logan Airport, Massport must first avoid, minimize, and then mitigate damage to the environment.[3] The ESPR must describe the nature and extent of the proposed environmental impacts, all measures to minimize said damage, adverse short-term and long-term environmental consequences that cannot be avoided, and reasonable alternatives.[4] CLF is concerned that the ESPR underestimates likely passenger growth figures and so fails to describe the extent of environmental impacts and minimizes the range of required mitigation measures. By underestimating the growth estimates, Massport has not satisfied the Massachusetts Environmental Policy Act (MEPA) requirement to use "all practicable means and measures to minimize damage to the environment."[5] CLF identified the following numerical discrepancies in the ESPR relating to passenger growth. 10-1

- **Discrepancies between Massport's presented figures and annual growth rates.** The ESPR includes a forecasted 1.5 percent annual passenger growth rate, applicable to Massport's Future Planning Horizon of 10 to 15 years. This value is referenced as the rate of "average annual growth" in the main body of the document but is referenced as the rate of "compound annual growth" in Appendix E.[6] Massport clarified by e-mail that the growth rates are calculated using the compound average

[2] Letter Agreement by and between the Massachusetts Port Authority and the Conservation Law Foundation on emissions reduction measures, (May 18, 2017) (attached).
[3] G.L. c. 30, § 61.
[4] G.L. c. 30, § 62B.
[5] G.L. c. 30, § 61.
[6] For "average annual growth" reference, see Table 2-8 in the main body of the report (p.2-36); for the "compound average growth" reference" see Table E-5 in Appendix E (p. E-12).

growth method.[7] The ESPR notes that passenger traffic for 2017 was approximately 38.4 million while the forecasted value for the Future Planning Horizon is 50.1 million.[8] Within the specified time horizon of 10-15 years, it is unclear how Massport derived the projected figure of 50.1 million. Using the 2017 passenger count and the Future Planning Horizon figure, the average annual growth rate is between 2.0-3.0 percent and the compound average growth rate is between 1.8-2.7 percent depending on the exact time horizon.[9] For aircraft operations, Massport estimates a compound average growth rate of 1.1 percent.[10] Within the specified time horizon, using the 2017 aircraft operations value and the Future Planning Horizon figure, the compound average growth rate is between 1.3-1.9 percent, slightly above the presented growth rate of 1.1 percent.[11]

- **Discrepancies between federal forecasts and growth rate.** The ESPR references Federal Aviation Administration (FAA)'s Terminal Area Forecast (TAF) estimates.[12,13] Specifically, Massport notes that its forecasts are considered "consistent with TAF" for a five-year and ten-year planning horizon and that Massport prepared a reference comparison to the TAF figures.[14] However, this reference comparison is not provided in the body of the ESPR. Additionally, Massport's forecasted figures do not appear to be directly comparable as FAA forecasts "enplanements" by airport, which includes passengers originating from the airport and those making connections.[15] However, using FAA's forecasted passenger counts, the average annual growth rate for the Future Planning Horizon is between 3.3-3.4 percent while the compound average growth rate is between 2.7-3.0 percent.[16] Massport reported that it has incorporated into the passenger forecast short-term service assumptions that are based on direct feedback from the major airlines serving the Airport while also incorporating the traditional economic modeling over the longer term, a different method than the one used for the TAF estimates.[17] Both of these rates are well above the estimated rate of 1.5 percent.[18] Similarly, for aircraft operations, the figures provided by FAA yield a compound average growth rate of

[7] E-mail from Flavio Leo to Saritha Ramakrishna and Staci Rubin, November 15, 2019.
[8] Table E-5, Appendix E (p. E-12).
[9] Calculated.
[10] ESPR 2017, p. 2-39, Table 2-10.
[11] Calculated using 2017 count of 401,371 operations and the forecasted value of 486,364 in ESPR Table 2-10.
[12] ESPR 2017, p. 2-37.
[13] Data are hosted at U.S. Federal Aviation Administration. Terminal Area Forecast. Accessed 2 October 2019 at https://www.faa.gov/data_research/aviation/taf/. We utilize the query results from FAA's data interface: https://taf.faa.gov/.
[14] ESPR 2017, p. 2-37.
[15] 14 C.F.R. Part 241.
[16] Calculated based on query totals found through FAA's data interface: https://taf.faa.gov/.
[17] E-mail from Flavio Leo to Saritha Ramakrishna and Staci Rubin, November 15, 2019.
[18] ESPR 2017, p. 2-36.

2.3 percent, which is higher than the stated rate of 1.1 percent.[19] FAA also publishes growth rates for 2017-2045, a 28-year time horizon. For enplanements, the published growth rate is 2.36 percent,[20] and for operations, the growth rate is 2.04 percent.[21] Both of these rates are higher than the projected rates provided in the ESPR.

- **Discrepancies between the Future Planning Horizon growth rate and historic growth rates.** The passenger growth rate from 2007-2017 was 3.7 percent when represented as an annual average growth rate and 3.2 percent when represented as a compound average growth rate.[22] This rate is higher than the forecasted value, and reflects passenger decline due to the recession. The growth rate from 2010-2017 was 5.7 percent when represented as an annual average growth rate or 4.9 percent when represented as a compound average growth rate.[23] A separate study by OAG, a provider of travel data, found Logan's passenger growth rate to be increasing at a rate over 5 percent annually.[24] The aircraft operations compound average growth rate from 2007-2017 was lower than the forecasted rate at 0.05 percent, but following the recession, the rate from 2010-2017 was higher than the forecasted value at approximately 1.9 percent.[25]
- **Indicators of Future Growth.** Massport also describes factors that affect growth rates. None of these factors as they apply to Massachusetts and Logan Airport seem to suggest the rate of passenger growth will decline within the Future Planning Horizon. All evidence points to the contrary that passenger growth rate will continue to grow.
  - **Per Capita Income**. Massport notes that during the period from 2007 to 2017, per capita income in Massachusetts "grew slightly faster than in the U.S. as a whole." Massport goes on to state that "…Boston's strong economy will continue to be the main driver of Logan Airport's passenger growth."[26]
  - **Airline focus on cost control.** Massport notes that "lower oil prices and decreased fuel expenses over the past two years have contributed to an increase in GA [General Aviation] activity"[27] simultaneously noting "many airlines are replacing aging aircraft with more fuel efficient, modern models,"

[19] Calculated.
[20] Data are hosted at U.S. Federal Aviation Administration. Terminal Area Forecast, https://www.faa.gov/data_research/aviation/taf/. This referenced figure is found in the "Terminal Area Forecast Summary, FY 2018–2045" document, p. 6. (Accessed October 2, 2019).
[21] *Id.* at p. 8.
[22] Calculated from passenger counts presented in Table E-1, Appendix E (p. E-3).
[23] *Id.*
[24] The Boston Globe. 9/14/2019. Logan poised to become one of the 10 busiest airports in the country, at https://www.bostonglobe.com/lifestyle/travel/2019/09/04/logan-poised-become-one-busiest-airports-country/0k2zL5MOiueDSQAfahnS2J/story.html (Accessed October 2, 2019).
[25] Calculated from values in ESPR Appendix Table E-1, p. E-3.
[26] ESPR 2017, p. 2-27.
[27] ESPR 2017, p. 2-16.

implying that lower fuel costs positively relate to overall airport activity. [28] Airlines have also been "increasing the number of seats on aircraft in an effort to serve more passengers per flight" where "passenger enplanements at Logan Airport have increased an average of 89.4 per departure in 2012 to 103.5 in 2017," implying higher passenger volumes relative to total airline operations. [29] We note that these statistics do support a falling growth rate for aircraft operations.

- **Increased share of passengers among regional airports.** Massport notes that "In 2007, Logan Airport accounted for 76 percent of regional passengers compared to 87 percent in 2017, an increase of 11 percentage points."[30] Logan Airport's share of regional activity has historically increased, implying continued passenger growth.
- **Airline operations expansion.** JetBlue, an airline that operates a significant share of flights at Logan Airport has "continued to expand, increasing its domestic operations by 10.5 percent from 84,590 operations in 2016 to 93,485 operations in 2017."[31] Delta is also expanding operations, and plans to add 150 additional flights by March 2020.[32]

Massport's 2011 ESPR presented an average annual passenger growth rate of 1.7 percent, applicable to the years of 2011-2030.[33] This forecasted rate has thus far significantly underestimated actual growth. Forecasted activity levels are a direct input to Massport's forecasted environmental impacts, including the pollution and emissions impacts of ground transportation, where Massport assumes an increase of 11.5 million passengers.[34] These forecasted environmental impacts do not adequately reflect the impact of Logan operations to the environment, health, noise, and quality of life of the nearby communities. For example, Massport forecasts that in the Future Planning Horizon, daily on-airport Vehicle Miles Traveled (VMT) will be 9 percent less than the VMT in 2017, where the decline is attributed to infrastructure improvements and modification to ground transport.[35] However, if passenger traffic increases at a much higher anticipated rate than predicted in the ESPR, this reduction may not occur within 10-15 years.

Massport acknowledges that "when activity levels reach 50 million air passengers, it anticipates that Massport transportation policy changes and potential infrastructure modifications that reduce on-Airport VMT will be in place." While the ESPR forecasts that the airport will reach 50

[28] ESPR 2017, p. 2-31.
[29] ESPR 2017, p. 2-31.
[30] ESPR 2017, p. 2-32.
[31] ESPR 2017, p. 2-18.
[32] WCVB, "Delta's targeting JetBlue in Boston, plans to increase Logan Airport departures by 25 percent," May 13, 2019, https://www.wcvb.com/article/deltas-targeting-jetblue-in-boston-plans-to-increase-logan-airport-departures-by-25-percent/27459947# (Accessed October 2, 2019).
[33] ESPR 2011, Table 2-28, p. 2-28.
[34] ESPR 2017, p. 5-31.
[35] ESPR 2017, p. 5-32.

million passengers within the next 10 years, if the growth rate for the last seven years continues (approximately 5 percent), then Logan Airport's passenger count will reach 50 million within five to six years, well before the 10-15 year Future Planning Horizon.[36] Infrastructure upgrades to reduce congestion and pollution will need to be made sooner if Massport intends to implement mitigating actions once reaching 50 million passengers.

Noting these discrepancies, CLF urges Massport to clarify the derivation of its 1.5 percent annual growth rate for passengers and 1.1 percent annual growth rate for aircraft operations, especially because these rates provide the basis for estimating future environmental impacts, while potentially affecting the schedule by which Massport should upgrade its ground transportation infrastructure. Further, CLF requests that Massport provide a revised ESPR with a high growth scenario forecast of passenger growth**.** 10-1

B. CLF seeks additional detail in the ESPR regarding ground transportation to conform with the Massport-CLF agreement.

Pursuant to the Massport-CLF agreement, Massport agreed to undertake a comprehensive program to reduce ground transportation impacts by encouraging HOV mode transportation to and from the airport.

- **Employee Transit**. Massport agreed to establish a program to offer its 18,000 Logan Airport based employees effectively free (net of employer subsidies) Massachusetts Bay Transportation Authority (MBTA) Blue Line service from Airport Station by January 2019 to assist lower-wage workers in environmental justice communities.[37] This program would serve larger goals of transit and environmental justice. Language about this agreement appears to be absent from the ESPR, where Massport notes that it promotes the HOV services serving passengers to its employees, including the Blue Line, Silver Line, Logan Express and water transportation.[38] Massport provides shuttle bus service for passengers and employees between the Blue Line Airport Station and all terminals, [39] while also supporting the Sunrise Shuttle, which provides early morning bus service for employees in East Boston and parts of Winthrop and Revere.[40] However, these services are not equivalent to free MBTA Blue Line service for employees. As this was a component of the Massport-CLF agreement, Massport should explicitly include the free Blue Line service program for employees in the ESPR. 10-1
- **Logan Express service.** Massport also agreed to increase its Logan Express service capacity by 10 percent by the end of 2019.[41] The ESPR states that

[36] Calculated.
[37] Massport-CLF Agreement (May 18, 2017).
[38] ESPR 2017, Table 7-17, p. 7-55.
[39] *Id.*
[40] ESPR 2017, Table 5-6, p. 5-28.
[41] Massport-CLF Agreement (May 18, 2017).

Massport has increased Braintree Logan Express service from two to three trips per hour as of May 2019.[42] For its Back Bay Logan Express service, Massport implemented a discounted one-way fare, with free service from Logan Airport while also providing passengers priority security line status.[43] Massport also plans to offer a new Logan Express service at North Station by 2020, where the same rate and priority service would apply. [44] CLF encourages this expanded capacity, incentives, and new service. However, Massport should clarify whether these improvements will allow it to meet the its capacity goal, and to consider the implementation of discounted and free trips as well as security line prioritization for suburban express services in Braintree, Framingham, Peabody and Woburn Logan Express services. 10-2
Offering security line prioritization and no-cost trips will increase passenger reliance on the Logan Express services contributing to reduced congestion, improved air quality, and fewer GHG emissions.

- **Transportation Network Company (TNC) HOV definition.** CLF and Massport have agreed that TNC trips could be credited as HOV trips, if these trips include on average, no less than 2.0 passengers per vehicle.[45] The ESPR acknowledges this updated definition, where previously Massport defined all taxis and TNCs as non-HOV.[46] Massport's latest air passenger ground-access survey was conducted using the previous definition.[47] The updated survey should include the new definition and thus serve as the basis for Massport's HOV commitments, specifically a goal of 35.5 percent HOV by 2022 and 40 percent HOV by 2027. The new definition will allow Massport to more accurately report on its HOV commitments. Notwithstanding the agreement for TNC trips to be credited as HOV trips, the TNC trips constitute a larger than expected portion of the HOV and Massport should consider discounting the TNC trips in some way. 10-3
- **TNC Fee Structure.** Massport agreed to incentivize ride-sharing by establishing a ride-share trip fee on a per-trip basis rather than a per-person basis by January 1, 2019.[48] While the ESPR notes that a new TNC fee structure is "under study,"[49] it is unclear whether this fee structure has been implemented or is still in consideration. Massport should explicitly explain how it is incentivizing ride-sharing in the EPSR through a per-trip fee rather than a per-person fee. 10-4

[42] ESPR 2017, Table 5-8, p. 5-33.
[43] ESPR 2017, p. 3-8.
[44] ESPR 2017, Table 5-8, p. 5-33.
[45] Massport-CLF Agreement (May 18, 2017).
[46] ESPR 2017, p. 3-9.
[47] *Id.*
[48] Massport-CLF Agreement (May 18, 2017).
[49] ESPR 2017, Table 3-2, p. 3-13.

- **Future ground transportation studies.** The Massachusetts Department of Environmental Protection (MassDEP)'s Draft Parking Freeze Amendment calls for Massport to study short and long-term parking rates or variable rate parking.[50] Massport notes that "parking pricing review" is ongoing but does not provide detail on whether it plans to study variable rate pricing structures.[51] The ESPR should clarify Massport's plans for study of variable-rate parking. 10-5

C. CLF seeks additional detail in the ESPR regarding air quality and public health to conform with the Massport-CLF agreement. 10-1

In addition to its HOV commitments, Massport has committed to improvements that would improve air quality and reduce pollution including the replacement of gas- and diesel-powered ground service equipment (GSE) with electric equivalents by 2027.[52] CLF continues to encourage and support Massport's efforts in reducing emissions from its GSE, and in its GHG-reduction initiatives and investments in renewable energy. We also support Massport's completed additions of new EV charging stations, and the addition of the 62 new stations it plans to add by 2020.[53] The comments below reflect future projections of air quality and air quality impacts. 10-6

- **Reconcile air quality forecasts with activity forecast.** Massport total emissions of carbon monoxide, particulate matter (PM) PM_{10}/$PM_{2.5}$, and Volatile Organic Compounds (VOCs) are predicted to decrease further by about 2 percent, 10 percent, and 8 percent, respectively, compared to 2017 levels.[54] These estimations were made considering Massport's forecasted passenger and air operations growth, which as noted previously, could potentially be underestimated. Once Massport clarifies these growth rates and predictions, it should also clarify whether these reductions still apply. 10-7
- **Climate impacts and air quality.** The Massachusetts Department of Public Health Study (MassDPH) found statistically significant effects of airport proximity on the probability of childhood asthma and adult chronic obstructive pulmonary disease COPD).[55] CLF encourages the continuation of the programs Massport has created to mitigate the effects of airport pollution, including an agreement to provide funding to the East Boston Neighborhood Health Center to treat and prevent asthma and COPD, and its agreements with 10-7

[50] Massport-CLF Agreement (May 18, 2017).
[51] ESPR Table 5-6, p. 5-27.
[52] ESPR 2017, p. 7-1.
[53] ESPR 2017, p. 1-17.
[54] ESPR 2017, p. 1-35.
[55] Massachusetts Department of Public Health. Bureau of Environmental Health Logan Airport Health Study (2014), https://www.mass.gov/files/documents/2016/07/ww/logan-airport-health-study-final.pdf (Accessed October 2, 2019).

MassDPH and the Massachusetts League of Community Health Centers.[56] 10-7
CLF also encourages Massport to further increase its mitigation efforts related 10-8
to air quality, public health, and noise. The City of Boston estimates that Boston's average summer temperatures and the number of days with extreme heat will increase.[57] Boston and other urban areas are prone to urban heat island effect, which results from the retention of heat by building materials, versus vegetation. By 2030, Boston will see 20-40 days above 90 degrees with similar effects for communities around the greater urban area.[58] Extreme heat increases the concentration of ozone and particulate matter in the air, which can have detrimental effects on those with respiratory conditions.[59] As the effects of climate change progress, Massport should consider its ability to mitigate negative air quality effects as a matter of public health. Moreover, CLF strongly encourages Massport to work with community-based 10-7
organizations to collaboratively determine how to further mitigate air quality impacts through installation of air filters that significantly reduce the amount of particulate matter, including ultrafines.

- **Noise:** CLF suggests that noise impacts to EJ populations be mitigated and that Massport work with residents and community organizations in East Boston, Chelsea, Revere, and Winthrop to determine appropriate mitigation. and work with us (and our municipalities) to build mitigation plans that 10-9
address the impacts of those scenarios.

D. CLF encourages Massport to engage in additional community meetings to discuss appropriate air quality, noise, and other mitigation measures.

CLF has enjoyed the opportunity to meet directly with Massport leadership and staff in recent years. Community-based organizations in surrounding communities such as East Boston, Chelsea, Revere, and Winthrop have not had the same access to Massport leadership and staff. Logan Airport is located near state-designated environmental justice communities.[60] State law and policies require enhanced engagement with residents of environmental justice

[56] ESPR 2017, p. 7-58.
[57] City of Boston, "Climate Projection Consensus," Page 5, December 2016, https://www.boston.gov/sites/default/files/03_climate_ready_boston_digital_climateprojectionconsensus.pdf (Accessed November 18, 2019).
[58] City of Boston, "Climate Ready Boston, Executive Summary," Page 11, December 2016, https://www.boston.gov/sites/default/files/02_20161206_executivesummary_digital.pdf (Accessed October 2, 2019).
[59] Massachusetts Department of Public Health - Bureau of Environmental Health, "Climate and Health Profiles," https://matracking.ehs.state.ma.us/Climate-Change/climate_and_health_profile.html (Accessed October 2, 2019).
[60] Massachusetts Environmental Justice Viewer, http://maps.massgis.state.ma.us/map_ol/ej.php (Accessed October 2, 2019).

communities.[61] To that end, CLF encourages Massport to hold community meetings, outside of
MEPA processes and after MEPA deadlines expire, to discuss ways for Massport to be a better 10-10
neighbor and best implement mitigation measures associated with its environmental impacts.

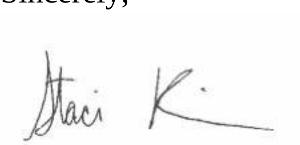
E. CLF urges the Secretary to work with Massport to withdraw and refile its ESPR to include updated passenger growth counts and associated mitigation measures. 10-11

Massport is taking material steps in reducing its environmental impacts which CLF supports,
including overhauling ground transportation at Logan Airport, and pursuing mitigation for air
quality and noise impacts. As Massport forecasts its growth and plans its mitigation activities,
the sources of these assumptions should be clear, and their implications should be explicit in the 10-12
ESPR.

CLF requests that Secretary Theoharides and the MEPA staff work with Massport to withdraw
the ESPR and refile it in accordance with 301 CMR 11.08(5) to allow for revised passenger
counts and associated mitigation measures for another public comment period. Alternatively, the 10-1
Secretary should find that the ESPR is inadequate and require Massport to file a supplemental
EIR in accordance with 301 CMR 11.07.

CLF is happy to provide additional information and assistance as may be required. You may contact me with questions at SRubin@clf.org and 617-850-1781.

Sincerely,



Staci Rubin
Senior Attorney

[61] Executive Order No. 552 (2014), https://www.mass.gov/files/documents/2017/11/29/Executive%20Order%20on%20Environmental%20Justice%20links%20to%20PDF%20file.pdf; Massachusetts Environmental Justice Policy, (2017), https://www.mass.gov/files/documents/2017/11/29/2017-environmental-justice-policy_0.pdf.

Attachment

Massport-CLF Agreement

Massachusetts Port Authority
One Harborside Drive, Suite 200S
East Boston, MA 02128-2909
Telephone (617) 568-5000
www.massport.com

May 18, 2017

Bradley M. Campbell, President
Conservation Law Foundation
62 Summer Street
Boston, MA 02110

Re: Letter Agreement by and between the Massachusetts Port Authority and the Conservation Law Foundation on Trip Reduction Strategy

Dear Bradley,

As you know, the Massachusetts Department of Environmental Protection (MassDEP) published a draft regulation, 310 CMR 7.30 ("Draft Regulation") to increase the Logan Airport Parking Freeze by 5,000 spaces on March 24, 2017, and held a public hearing on this regulatory amendment for April 25, 2017. To provide the public with maximum information on the parking projects for 5,000 spaces that underlie the Parking Freeze increase, Massport also filed an Environmental Notification Form (ENF) pursuant to the Massachusetts Environmental Policy Act (MEPA) to begin the MEPA process to allow for up to 5,000 additional parking spaces at Boston Logan International Airport (Logan Airport) on March 31, 2017.

The Massachusetts Port Authority (Massport) and the Conservation Law Foundation (CLF) have met a number of times over the past several months. In these productive meetings, CLF has urged Massport to commit to a number of transportation mitigation measures related to MassDEP's amendment of its Parking Freeze Regulation and Massport's proposed construction of an additional 5,000 parking spaces ("Parking Projects") at Logan Airport.

Massport and CLF agree that they share the goal of reducing the overall environmental and emissions impacts of travel to and from Logan Airport and encouraging an increase in the number of airport passengers who travel to and from the Airport by high occupancy vehicles (HOV). This letter sets forth the understandings and agreements reached between CLF and Massport regarding the Parking Projects resulting from these recent meetings.

I. Background

The proposed increase in parking supply at Logan Airport would not occur in isolation, but rather would be one component of a multi-pronged comprehensive program undertaken by Massport, to reduce the overall environmental and emissions impacts of travel to and from the Airport and encourage an increase in the number of Airport passengers who travel to and from the Airport by HOV.

Massport's Current HOV Commitments. Massport currently spends approximately $33,000,000 annually on HOV operations. Since 2002, Massport's capital expenditures for HOV operations have exceeded $160,000,000. Massport's HOV commitments include:

- prioritizing transit and HOV access to the Airport through the significant expansion of Logan Express sites and service and by its financial support of Silver Line access to Logan Airport;
- since 2005, the purchase of eight Silver Line buses that access the Airport;
- since 2012, financial support of Silver Line bus trips from the Airport terminals;
- the expansion of its original Logan Express sites from two to four locations, as well as the Back Bay Pilot location, resulting in an increase of the total capacity of HOV/shared-ride mode service by 154% since 1989; and
- as contemplated by the 1989 Amendment to the Logan Parking Freeze, Massport has also acquired Park-and-Fly lots in East Boston, permanently removing these spaces from East Boston and transferring them to the Airport.

II. Authority Commitments for Trip Reduction Strategy

As you are aware and as noted above, Massport has just begun the MEPA process for its proposed Parking Projects. Through that process, Massport will analyze the project-specific impacts of constructing additional parking spaces, and will propose a number of transportation-related measures that may improve Massport's and the Commonwealth's environmental performance (i.e., "mitigation measures"). As required by MEPA, Massport will ultimately issue Section 61 Findings that specify the means it will use to avoid damage to the environment, or, to the extent damage to the environment cannot be avoided, to minimize and mitigate damage to the environment to the maximum extent practicable. In our discussions, a number of potential mitigation measures have been considered. Massport appreciates CLF's recognition that its proposals may overlap with the MEPA process as the Parking Projects proceed. Based upon our discussions, in advance of that process, Massport has determined that it is able to agree with CLF in the following categories:

1. CLF initiatives that Massport is able to agree to implement or work toward implementing directly with CLF at this time;
2. Proposals that Massport is willing to commit to CLF will be a part of the MEPA Section 61 process; and
3. CLF proposals with respect to which Massport agrees to prepare data-driven scopes of work for the studies outlined in the MassDEP Draft Regulation, as appropriate, to focus on CLF specific proposals as described below.

1. Massport-CLF Initiatives

Massport and CLF hereby agree as follows:

A. Ground Access Improvement/Trip Reduction. Massport agrees to take the following measures:

- As noted above, since 2005 Massport has purchased and supported the operation of eight Silver Line buses for the portion of the Silver Line route that directly serves Logan Airport. As part of this Agreement, Massport commits to double this amount –

to purchase and support the operation of a total of 16 Silver Line buses, in accordance with parameters set forth in existing agreements, and in accordance with the MBTA's procurement schedule. If Massport and the MBTA do not have a signed agreement for new buses for the Silver Line by January 1, 2024, Massport will provide notice to CLF and offer substitute performance pursuant to Section IV.B.

- By January 2019, Massport further agrees to establish a program to offer the approximately 18,000 Logan Airport based employees effectively free (net of employer subsidies) Blue Line service from Airport Station, subject to the feasibility of implementing this program with the MBTA's forthcoming automated fare collection system. This initiative will primarily assist lower-wage employees in environmental justice communities.
- Massport agrees to implement variable-rate parking within one year of the opening of the new structured parking if the study described in Section II.3.A below demonstrates a positive impact.

B. HOV Goal. Massport agrees to the following:

- Massport will increase the share of air passengers using high occupancy vehicles (HOV) to access Logan Airport to at least 35.5 percent HOV mode share by December 31, 2022, and to further increase HOV mode share to 40 percent no later than December 31, 2027. If the goals set forth herein are not achieved by a deficit of more than 1% by the dates set forth herein, then Massport shall provide notice to CLF as set forth in Section IV.B. Consideration of substitute mitigation as set forth in such section shall include whether matters beyond the control of Massport (such as major change in transit or other HOV service provided by independent parties) impacted achievement of the goal.
- CLF agrees that Massport may reasonably include that portion of taxi, livery, and Transportation Network Company (TNC) trips for which it has a reasonable basis to conclude that the trips are properly credited as HOV trips. Such vehicles shall have on average no less than 2.0 passengers per vehicle.
- Massport further agrees to incentivize ride-sharing by establishing a ride-share trip fee on a per trip rather than per person basis starting no later than January 1, 2019. Massport also agrees that ground transportation personnel shall be trained to encourage passengers to share rides no later than January 1, 2019.

C. New Electric Vehicle (EV) Charging Stations. Massport currently has 26 EV charging stations in the Logan Airport parking garages. Massport commits to increasing the availability of EV charging stations so that 150% of demand for EV charging stations is available at all facilities at all times. This demand shall be measured as no more than 66.667% of EV charging stations to be in use at any time.

2. <u>Anticipated MEPA Commitments</u>

Massport will request that the MEPA Section 61 process will include the following initiatives, subject to the determination of the Executive Office of Energy and Environmental Affairs, in its Final Environmental Impact Report (FEIR) certificate. To the extent these initiatives are

substantially modified or omitted in the FEIR, CLF may elect to terminate this agreement in its entirety by written notice to Massport within thirty (30) days following publication of the FEIR.

A. Electrification of Ground-Service Equipment. Prior to commencement of construction of the first parking structure, Massport shall have in place an enforceable policy for the electrification of ground-service equipment. Pursuant to such policy, Massport shall complete a program for the replacement of all ground service equipment, where commercially available electric alternatives are available, no later than the end of 2027, with a limited deferral for equipment categories for which there are no commercially available electric alternatives. For those categories of equipment for which no electric or other zero emission alternative is commercially available by the end of 2027, such equipment will be replaced in those categories within two (2) years of such equipment becoming commercially available, provided that the equipment to be replaced is at least eight years old. In the alternative, Massport may develop a phased schedule in which certain categories are implemented earlier than 2027 and some categories are deployed later than 2027, so long as 2027 is the mean deployment date airport-wide.

Regardless, at least 9 percent of all ground service equipment for which commercially available electric alternatives are available shall be electric by the beginning of construction of the first parking structure, shall increase to 12 percent by the end of construction of the first parking structure, and shall increase to 24 percent by the end of construction of the second parking structure. Massport shall have in place procedures so that at least 60 percent of commercial aircraft taxiing for a re-positioning purpose will be done by electric tugs by 2027.

B. Expanding Logan Express (LEX) Service. With the understanding that HOV performance in transit and other modes is largely dependent upon factors outside of Massport's control, in striving to meet its HOV Goal, Massport agrees to increase its Logan Express capacity, measured in available seats, by 10 percent by the end of 2019.

C. Increase Percentage of Zero Emission Taxi, Livery and TNC Vehicles. Massport agrees to promote the use of electric vehicles among the combined fleet of taxi, livery, and TNC vehicles. Massport agrees to take the following measures:

- Starting in July of 2019, Massport will provide high-speed EV charging stations at all taxi, livery, and TNC pools at Logan Airport, so that 150% of demand for EV charging stations is available at all pools at all times. This demand shall be measured as no more than 66.667% of EV charging stations to be in use at any time.
- The EV charging stations will be provided at no cost to the user.
- Starting in January of 2019, Massport further agrees to provide taxi/TNC-queue priority to EVs, subject to negotiations with said companies, second only to vehicles with at least three passengers.

3. Parking Freeze Regulation Measures

Massport agrees to include as part of the studies referenced in the MassDEP Parking Freeze Regulation amendment the following:

A. Variable-Rate Parking. MassDEP's Draft Regulation calls for Massport to study short-term and long-term parking rates. Massport agrees to include in the study a scope of work that will consider variable pricing. The studies necessary to price and potentially implement this option shall be completed no later than at the time of the opening of any new structured parking.

B. Airport Pass-Through Rate. Massport agrees to include an airport pass-through rate as part of the study of costs and prices for different modes of transportation to and from Logan Airport as set forth in MassDEP's Draft Regulation. The studies necessary to price and potentially implement this option shall be completed no later than at the time of the opening of any new structured parking.

III. CLF Commitments

CLF hereby agrees as follows:

In consideration of Massport's commitments as set forth herein, CLF agrees not to file a lawsuit or otherwise challenge or oppose, and will favorably comment on the following:

1. the consideration and promulgation by MassDEP of the Logan Parking Freeze Amendment (310 CMR 7.30) and of Massport's role therein;
2. the review and approval of this regulatory change as an amendment to the SIP by the United States; Environmental Protection Agency, and of MassDEP's and Massport's roles therein; and
3. the Executive Office of Energy and Environmental Affairs' review and approval of the Logan Parking Projects through the MEPA process pursuant to MGL c. 30, Sections 61 through 62I, 301 CMR 11.00, and of MassDEP's and Massport's roles therein.

IV. Dispute Resolution and Enforceability

A. Massport and CLF agree that their respective obligations under this Agreement are binding and enforceable in the Courts of the Commonwealth.

B. The parties acknowledge that transportation behavior and environmental management is continually evolving. Massport and CLF agree that if: 1) Massport notifies CLF at least six (6) months prior to any milestone established herein that Massport is unlikely to reach the milestone, or, 2) if the parties agree that a substitute mitigation measure exists that has equal or greater effectiveness than a measure identified herein, Massport shall have the opportunity to offer substitute performance through alternative or substitute mitigation measures or other means. Massport shall provide CLF with adequate documentation to support its proposed substitute mitigation and CLF shall respond within 30 days of receiving the documentation, and it shall not unreasonably refuse to accept an adequately documented substitute mitigation within that time period.

V. **Miscellaneous Provisions**

A. This Agreement is subject to and subordinate to the provisions of federal law and to any agreement heretofore or hereafter made between Massport and the United States the execution of which is required to enable or permit the expenditure of federal grant funds for Airport improvement, maintenance or development. CLF shall consent to amendments and modifications of this Agreement if required by federal law or by such agreements with the United States, or if required as a condition of Massport's executing such Agreements with the United States in the future.

B. Unless otherwise specified herein, Massport shall not be expected to make any material investment in any measure set forth in Subsection 1 of Section II until commencement of construction of the Parking Projects. Massport shall have no obligation under this Agreement unless and until the Parking Freeze Regulation is approved.

C. Massport shall continue to report on its environmental data annually to MEPA, including the status of Section 61 Findings, through the EDR / ESPR process, which information shall also be provided to CLF. Massport will include in the annual EDR / ESPR submissions, reports on Massport's progress on the commitments set forth in this Agreement.

D. This Agreement shall remain in effect for ten (10) years after the completion of the Parking Projects at Logan Airport.

To acknowledge your agreement to the foregoing, please sign in the space provided below.

We look forward to continuing to work with you and your organization.

Sincerely,

Thomas P. Glynn
CEO and Executive Director
Massachusetts Port Authority

Agreed to by the Conservation Law Foundation

Bradley M. Campbell
President
Conservation Law Foundation

18 May 2017
Date

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From:	Peter Houk
To:	Canaday, Anne (EEA)
Subject:	2017 ESPR response
Date:	Saturday, November 16, 2019 12:24:40 PM
Attachments:	2017 ESPR response.docx

Dear Ms Canaday,
Please find attached my response to the Logan International Airport 2017 ESPR. I will send another hard copy to the secretary by USPS.
Thanks,

Peter Houk
Medford representative
Massport Community Advisory Committee

Peter Houk
97 Ashcroft Road
Medford, MA 02155

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

November 16, 2019

Dear Secretary Theoharides,

I am writing to you as a private citizen and also in my role as the Medford representative on the Massport Community Advisory Committee, regarding the 2017 Logan International Airport ESPR that was recently published.
I have read the ESPR and studied its various tables and appendices, but I don't write to quibble about numbers regarding growth projections or changes in noise exposure, although both do concern me. I write, instead, to pose a fundamental question about Logan that I would very much appreciate an answer to:

"How big is too big?"

In other words, what forces govern the growth of Logan International Airport, and do those forces have anything to do with the increasing impacts of the dramatic growth in volume at Logan on the Boston metro-area communities? In my role as Medford rep on the MCAC over the last 4 years it has become quite clear to me that there are two very different answers to this fundamental question, depending on where one lives and who one works for. 11-1

If one works for Massport or any of the industries associated with air travel (manufacturers, carriers, lobbyists, etc), or if one is an out-of-town traveler transiting Logan on a domestic or international trip, the answer is, "The bigger the better!". In this scenario, Logan's capacity is governed solely by consumer demand and the FAA's ability to design procedures that maximize the number of jets that can be pumped into the sky at all times of day or night. In this scenario, Logan is *never* too big – it just runs out of growth capacity at some point.

However, if one lives in one of the Boston metro areas that is affected by noise and/or air pollution, the answer is quite different. I propose that there is a different answer to this "how big is too big?" question, and the answer is, "Logan is already too big". It's well known that residents in the line-of-sight communities like Winthrop and East Boston already suffer higher incidents of particulate-related lung disease than other communities in the area. In the next ring of cities, like Somerville, Cambridge and my city of Medford, noise-related complaints about constant jet noise due to the implementation of the 2013 33L RNAV SID have increased

exponentially: in my own town of Medford, complaints increased from 15 calls from 10 households in 2012, the year before the RNAV SID was implemented, to **51,540 calls from 660 households** this year, to date. That's in a span of only 7 years.
Since I am the Medford rep, I hear frequently from many of my fellow citizens, and I know that these complaints arise partly from annoyance due to the repetitive noise caused by RNAV hyper-concentration of flight paths, and partly from sleep interruption that many suffer from the increase in late-night flights (and in particular the Cathay Pacific 811 flight to Hong Kong that departs at around 2AM every night of the week, and quite often flies a B777 low over residential neighborhoods).

Secretary Theoharides, I ask you to consider this: *people don't complain about noise unless they are truly annoyed.* Noise complaints actually are important and reliable data to indicate that air traffic volume at Logan has reached a level that presents a serious threat to the quality of life for many, many people in the Boston metro area. 11-2
Citizen complaints, and the alarming increase in the number of complaints, should be taken seriously by Massport, by the FAA, and by our legislators. 11-3 I do think that these entities should engage in talks with the city of Boston and surrounding cities to try to collectively answer this question of "how big is too big". 11-4 I believe that a process that involves true community input would reveal a different answer to this question that that reached by the FAA and associated stakeholders.

There should be another answer to the question of "how big is too big" other than "when Logan runs out of capacity".

We're already there.

Thanks for reading this, and I would welcome a response to my question.

Peter Houk
Medford representative
Massport Community Advisory Committee

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November 16, 2019 **Via Email**

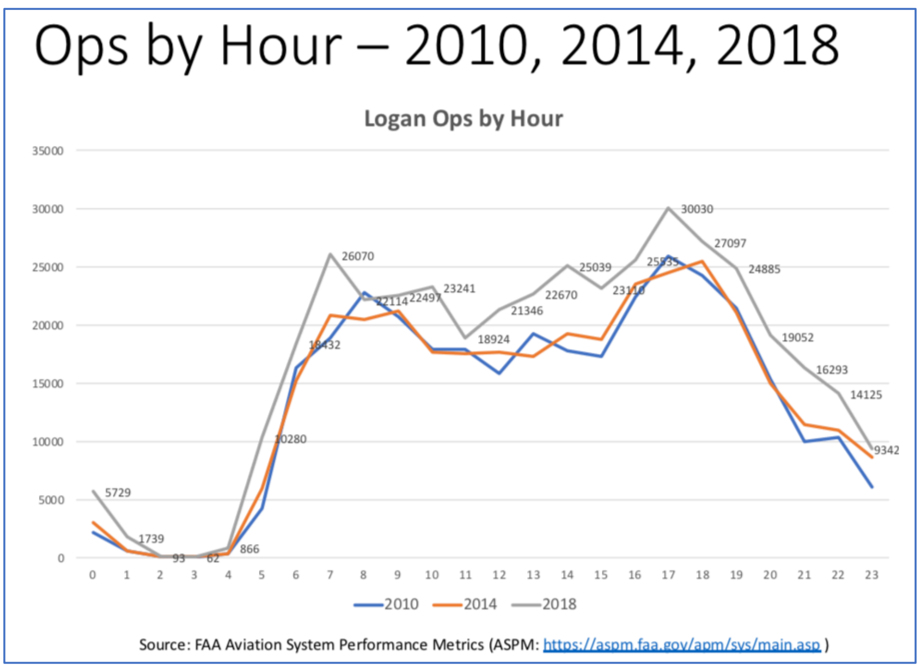
The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan Intl Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my concerns with several elements of the ESPR 2017. It should be rejected as incomplete and inadequate. It is incumbent on the State to ensure that Massport's reporting be complete and forthright for both current and recent operational conditions & activity levels and in projecting likely future conditions. 12-1

In reporting current and recent operational conditions, the 2017 ESPR **fails to adequately report** on two very significant elements:

1. The huge increases in flight operations in the early morning and late-night hours.



This chart shows the growth in early morning and late-night operations a Logan from 2010 to 2018. Overall Volume at Logan has increased 25%.

- Huge increases in three time slots
  - 8 pm – Midnight = 41%
  - Midnight to 2 am = 184%
  - 4 am – 6 am=148%
- Only 2 hours of respite 2 am – 4 am

Furthermore, though Logan does have a voluntary overnight noise abatement procedure (FAA Order 70401H BOS ATCT Noise Abatement Memo, Oct 28, 2007) that states:

> *c. Late Night Operations. (1) When practical and traffic permits, the preferable runway configuration between the hours of midnight and 6:00 a.m. is Land Runway 33L, depart 15R*.

This is commonly referred to at the "head-to-head over harbor" procedure. As stated, this procedure can only be used when traffic permits. Though the exact threshold is not known, what is know is that since planes are landing and departing head-to-head – for safety, there needs to be adequate separation between an arriving flight and a departing flight. If there are a handful of flights during an hour with adequate separation, then air traffic control can use this procedure – if not, then a conventional runway configuration needs to be used. All of these configurations have flights arriving or departing over populated areas – in some cases – like with 33L departures – this could be hundreds of thousands of people. Even one flight at 1:30 a.m. can be sleep-disruptive. We now have may hours between 8 pm and 1 am or 5 am to 7 am with 20 or more flights. Based on these facts, **Massport should be:**

- **Required to report to the State - Operations by hour to accurately capture these increases in highly sleep-disruptive early morning and late-night operations.** 12-2
- **Required to report on the FAA's ability to utilize the Late Night Operations noise abatement procedure.** 12-3

2. The impacts of the addition of new international destinations and the number of carriers and flights serving those destinations on the volume of connecting passengers. Passengers connecting through Logan to international flights may purchase a latte or bowl of chowder from one of the on-airport concessions – but they are <u>disproportionately impacting local communities with their contribution to noise and pollution</u>. Connecting "through passengers" do not provide the same economic benefit as Boston-area residents, employees, students and visitors to the region. The growth of Logan into an international hub has been a major contributor to issue #1 above – especially the expansion of flights in the late-night hours. A recent article in Forbes Magazine[1] stated that Logan is poised to become the East Coast's third largest European transatlantic gateway behind Newark and JFK. **Massport should be required to provide the State with historical, current and future projected passenger volume by % of Origination & Destination passengers and % of Connecting Passengers.** 12-4 Massport has done a very good job at executing their strategic plan to increase direct flights to international destinations. **The State should furthermore be asking if Massport should be continuing to provide monetary incentives to airlines to come to Logan**. 12-5 All

[1] https://www.forbes.com/sites/tedreed/2019/11/12/new-delta-hub-means-fast-growing-boston-logan-is-set-to-pass-miami-in-trans-atlantic-traffic/#53e8c6a41f4f

indications are the with the strong economy and passenger demand that Boston is an attractive market on its own merits without incentives.

In addition to these two important issues, Massport need to be encouraged to make significant investments in more comprehensive and timely reporting capabilities both in terms of systems and qualified in-house technical personnel. 12-6 The 18-24 month delay in production of EDR and ESPR makes the data supplied virtually useless in terms of being actionable. The proposed Fly Quiet Report is a very small step in that direction – but much of this aforementioned reporting, such as runway use by hour and utilization of the late night procedure should be part of the normal monthly public reporting. 12-7

I know others are submitting comments on important issues related to health impacts of both noise and pollution from aviation, ground transportation and airside operations. These need to be monitored and addressed. 12-8

In summary, Massport's aviation operations do play an important role in the State's economy and vitality – but the growth in operations comes at a cost in quality of life and health to those who are impacted by Logan's aviation operations. Your mandate is clear:

> ***"The MEPA review process provides meaningful opportunities for public review of potential environmental impacts of certain projects for which certain actions by state agencies are required. It requires state agencies to study the environmental impacts of projects requiring state permitting, financial assistance or land disposition, and to use all feasible measures to avoid, minimize, and mitigate damage to the environment or, to the extent damage to the environment cannot be avoided, to minimize and mitigate damage to the environment to the maximum extent practicable." Source:*** https://www.mass.gov/orgs/massachusetts-environmental-policy-act-office

It is my hope that these comments be given due consideration as you assess how Logan's operations impact local residents and communities and that you take action to ensure that Massport is doing their part to adequately report and address those impacts. 12-9

Sincerely,

//Myron Kassaraba*
43 Hastings Road
Belmont, MA 02478

* Town of Belmont Appointed Representative to the Massport Community Advisory Committee, these comments are my own.

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November 18, 2019

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, MA 02114

Re: EAE #3247 2017 Environmental Status and Planning Report

Dear Secretary Theoharides:

Please accept this letter of comment upon the 2017 Environmental Status and Planning Report (ESPR) submitted for Logan Airport by the Massachusetts Port Authority (Massport).

The Massport Community Advisory Committee (MCAC) was established as a state agency to provide advice and recommendations to Massport on its operations, programs, and budgets. With this charge in mind, the Massport CAC is not strictly limited to the official comment period when providing feedback to Massport and will likely submit feedback in future on not only the ESPR, but also the interim EDRs.

Environmental reporting is critical for an operation with the size, scope, and daily impact of Logan Airport, and it is a credit to the Commonwealth that MEPA has required such annual reporting from Massport for nearly four decades.

One area of concern voiced by MCAC members has been relative to both the timeframe and timing of the ESPR. This ESPR is for 2017 and is being presented for comment and final approval near the end of calendar year 2019. This means the extant data and reporting for the ESPR are reflective of a timeframe much earlier than the time at which it is being reviewed and published. Moreover, this means the ESPR's forecasts – the main difference between the ESPR and the EDR –are based on earlier data and calculations and may have changed since 2017. While compiling this level of detailed reporting clearly takes some time, one consistent request from MCAC members has been to shorten the window between the year being reported on (2017 in this case) and the year of publication (2019). 13-1

Another concern that has been voiced by MCAC members is the length of comment period. While this year's comment period was extended due to unique circumstances, even a 60-day comment period makes it challenging for any individual or organization to thoroughly review, vet, and comment upon such a detailed and voluminous document. 13-2

The third concern is not limited to MCAC members. As many individuals, including some elected officials, at the ESPR public hearing noted there is considerable concern about Logan's projected growth and the forecasting provided in the ESPR. While forecasting is by definition an estimate, there remain the questions of both the projected pace of growth at Logan as well as its impacts upon the communities. 13-3

Sincerely,

Matthew A. Romero
Executive Director
Massport Community Advisory Committee

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DATE: 9/8/2019

TO: Secretary of Energy and Environmental Affairs
Executive Office of Energy and Environmental Affairs
Att'n: MEPA Office Environmental Analyst Anne Canaday
100 Cambridge St., Suite 900
Boston, MA 02114

DELIVERED BY EMAIL ON 9/8/2019: anne.canaday@mass.gov

FROM: Maryann Aberg (gordon-and-maryann@comcast.net)
Founder, Logan Aircraft Noise Working Group
75 Park St., Unit 14
Medford, MA 02155

PROJECT NAME/NUMBER: Boston Logan International Airport 2017 Environmental Status and Planning Report (EEA #3247)

Dear Ms. Canaday:

Hundreds of thousands of Boston area residents are adversely affected by Federal Aviation Administration (FAA) and Massachusetts Port Authority (Massport) NextGen RNAV flights. As the founder of Logan Aircraft Noise Working Group, I appreciate this opportunity to comment on Massport's 2017 Environmental Status and Planning Report (ESPR) for Boston Logan International Airport.

Instead of responding to every detail of this Report, most of our members will focus on something we know only too well: the devastating impact of Massport's flight policies on the lives of our families and friends.

FAA and Massport's Deeply Cynical Strategy

Massport's ESPR paints a rosy picture of Logan Airport's contribution to "strong national and regional economies" without adequately acknowledging and addressing the effects of its operations on communities beneath and adjacent to RNAV flight paths. Before these policies were rolled out on December 15, 2011, Boston area residents never could have imagined how their lives would be disrupted.

Touted as a means of promoting "efficiency" and "safety," this deeply cynical strategy concentrates flights into a few narrow, low-altitude corridors to geographically isolate noise and increase carrier capacity without raising the concerns of most citizens. Because virtually all jet airline traffic is dumped onto a minority of "sacrificial neighborhoods," an already intolerable situation has deteriorated into a crisis.

This scheme—enabled by passage of the flawed Airport Noise and Capacity Act of 1990—also allows FAA, Massport, and airlines to expand operations by scheduling flights from 10 pm through 7 am. Moreover, in a deliberate misapplication of the National Environmental Policy Act (NEPA), FAA's standards for environmental assessment were shrewdly calculated to return findings of "no significant impact." Yet growing epidemiological evidence suggests a causal relationship between low-altitude aviation traffic and impaired cognitive development in children as well as cardiovascular disease in adults.

It is telling that Massport placed the first waypoint for jets departing from Runway 33L above a complex of three public schools located seven miles from Logan Airport in Medford. Hundreds of low-altitude flights pass over students on this campus, disrupting classrooms and quiet study areas. Many of these planes then head past the multi-story Medford Senior Center and Tufts University before targeting lower and upper schools, colleges, and affordable-housing developments in Arlington, Belmont, Cambridge, Malden, Melrose, Milton, Newton, Somerville, Watertown, and Winchester. Logan Aircraft Noise Working Group does not believe it is morally defensible to expose a relatively small segment of citizens—especially children, elders, and other vulnerable groups—to *all* jet traffic departing from a single Logan Airport runway.

Residents who cannot hear planes over their homes are unwitting victims of the same particulate emissions as those whose neighborhoods are audibly bombarded by aircraft. Millions of hearts and lungs are gradually being damaged by this invisible pollution. But, because many citizens do not understand the health impacts of this exposure, they fail to file complaints with Massport. The aviation industry then uses their "silence" to justify RNAV's inequitably dispersed flights. Whether FAA and Massport admit it or not, everyone will eventually pay for this scourge on our communities through increased health costs and decreased property values.

In its next Environmental Data Report, Massport is required by law to respond to every issue raised in public comments. Members of Logan Aircraft Noise Working Group will be taking advantage of this rare opportunity to share their unique perspective as victims of FAA's and Massport's profit-centered policies.

EXPECTED EFFECTS OF GLOBAL WARMING ON MASSPORT OPERATIONS

In 2018, the National Oceanic and Atmospheric Administration predicted that global warming will submerge critical transportation infrastructure in coastal areas of the United States within a few decades. See U.S. Global Change Research Program's *Fourth National Climate Assessment,* vol II (2018), produced by more than 300 experts from federal, state, and local governments; national laboratories, universities, and the private sector; with input from external stakeholders. This report (https://nca2018.globalchange.gov) focuses

> on the human welfare, societal, and environmental elements of climate change … with particular attention paid to observed and projected risks, impacts, consideration of risk reduction, and implications under different mitigation pathways.

According to documented research in the study:

> Throughout this century, climate change will continue to pose a risk to U.S. transportation infrastructure, with regional differences. … Sea level rise (SLR) is progressively making coastal roads and bridges more vulnerable and less reliable. … Higher sea levels will cause more severe flooding and more damage during coastal storms and hurricanes. Recent modeling shows how 1 foot of SLR combined with storm surge can result in more than 1 foot of increased storm surge. …
>
> SLR and storm surge also threaten coastal airports … [A] rise of as much as 8 feet by 2100 is scientifically plausible due to possible Antarctic Ice Sheet instabilities. Coastal infrastructure will be exposed to the effects of relative SLR, which includes vertical land motion in addition to regional variations in the distribution of the global SLR. For example, relative SLR will be higher than the global average on the East and Gulf Coasts of the United States because of the sum of these effects.
>
> … Transportation systems that are most vulnerable to the recent observed and projected increases in precipitation intensity are those where drainage is already at capacity, where projected heavy rainfall events will occur over prolonged

periods, and where changing winter precipitation increases transportation hazards from landslides and washouts.

See https://scenarios.globalchange.gov/sea-level-rise for scenarios illustrating a range of "plausible … changes" in "local sea level rise along the entire U.S. coastline."

Given the inevitability of this future, it's time for Massport to abandon its efforts to increase capacity at Logan Airport and focus on moving its operations far from the coast and residents of a major metropolitan area. 14-2

MASSPORT'S ETHICAL RESPONSIBILITY TO BOSTON AREA RESIDENTS

Instead of doubling down on its morally bankrupt RNAV policies, Massport has an ethical responsibility to:

- Disperse flights equitably by creating paths over all or most Boston area neighborhoods, not just a few narrow corridors, and make that policy the central focus of Professor John Hansman's MIT Noise Study recommendations;
- Mandate higher altitudes over residential areas at all times;
- Eliminate noise over residential areas between 10 pm and 7 am by requiring over-water flight approaches and departures;
- Move waypoints away from schools, homes, elder residences, and affordable-housing developments—working closely with representatives on the Massport Community Advisory Committee, city officials, and advocate groups to choose more suitable locations; 14-1
- Eliminate NEPA loopholes enabling environmental assessments to falsely find "no significant impact" from RNAV flight paths;
- Work with the Joint Commission on Public Health and public health departments to investigate the health impacts of RNAV-related noise and particulate pollution; and
- Require significant changes in the Massport noise-complaint system to eliminate its burdens and bias.

Thank you for providing this means for our group to share its perspective on FAA and Massport's NextGen RNAV policies. We look forward to helping Massport develop socially responsible procedures that enhance rather than disrupt the lives of residents in the Boston area.

From: Michael Adamian
To: Canaday, Anne (EEA)
Subject: EEA #3247 <Boston Logan International Airport 2017 Environmental Status and Planning Report>
Date: Friday, October 4, 2019 11:59:39 AM

Dear Anne Canaday : Environmental Analyst

My name is Michael Adamian and I live at 33 Capen St, in Medford Massachusetts , known as the Medford Hillside. The RNAV Routes fork right over my home. A home I've owned and lived in for 26 yrs. I am writing you today Oct 4th 2019 to submit and add my comments to EEA #3247 as a citizen environmentally affected by the Massport RNAV flight operations that have impacted my life since 2013 . As I write you today, jet planes from Massport have been flying over my house at altitudes between 3 and 5000 ft. at a rate of one plane every 2 minutes. This will continue for hours, well into the night, and possibly until 1 or 2 in the morning. They often start again at 5 am the next day making our ability and human right to sleep impossible. Thought and concentration become increasingly difficult as the hrs and constant jet noise progresses.

These flights cause highly increased anxiety in those who are experiencing the prolonged exposure to their repetitive metronomic assaults. We become increasingly angry and our blood pressures rise. It is maddening. This is our normal life now. I live 7 miles from Massport.
The air pollution in my neighborhood has palpably increased. I've experience greater rates of bronchial illness and forms of asthma that I never experienced before RNAV, requiring inhalers and visits to my physician.

These flights are not everyday. Our sanity is at the whim of flight directors and wind direction. We live in fear and in anticipation of these flights now; of the next sky ripping jet flying over us. These constant flights make us suffer on average 4 days a week but as I stated we are at the mercy of flight directors and the wind. Life on the Medford Hillside is becoming increasingly untenable. I love my home and worked hard for 40yrs to obtain it, however, I know I can't tolerate this much longer. I am now constantly thinking of selling and leaving this area.

Your planes and operating systems are driving us from our homes, making us ill, and destroying the peace of our community. Massport must spread out these flights equitably over greater Boston as they were before the narrow RNAV flight corridors were established and not just over "sacrificial zones ". All RNAV has done is shift noise and illness and pollution from ~62K people to a different group of 62K people. 15-1 Also these constant flights over us during the night must end between the hrs of 10pm to 7am so residents can sleep! 15-2 In addition Massport must limit its growth; it is destroying the health of our area with its increasing noise and air pollution. 15-3

Please submit my comments into the public comment section of your report.

Respectfully yours,

Michael Adamian

From: dorothy ahle
To: Canaday, Anne (EEA)
Subject: ESPR Report
Date: Monday, November 18, 2019 9:19:16 AM

Dear Sec. Theoharides,

I'm writing to urge you to reject Massport's ESPR report. The report's future projections are based on unreasonably low passenger growth forecast. 16-1

Sincerely,

Dorothy Ahle
8 Grimshaw St.
Malden, MA 02148

Get Outlook for Android

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From:	Gillian Anderson
To:	Canaday, Anne (EEA)
Cc:	lydia.edwards@boston.gov; joseph.boncore@masenate.gov; adrian.madaro@mahouse.gov; cis@sec.state.ma.us; MEPA (ENV); mayor@boston.gov
Subject:	Opposition to ESPR 2017
Date:	Thursday, October 10, 2019 1:45:33 PM

TO: Kathleen Theoharides,
Secretary Executive Office of Environmental Affairs

ATTN: Anne Canaday

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 17-1

Sincerely,

Gillian Anderson, PO Box 443, East Boston, MA 02128 (6175616095)

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From:	Lisa A
To:	Canaday, Anne (EEA)
Subject:	Boston Logan International Airport 2017 Environmental Status and Planning Report (EEA #3247)"
Date:	Saturday, November 16, 2019 3:56:26 PM

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan Intl Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

As a resident of Medford, MA I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution. ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. The failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

Logan Airport's claimed contributions to "strong national and regional economies" comes on the back of the communities beneath and adjacent to RNAV flight paths - communities it claims to serve. While touting RNAV as a means of promoting "efficiency" and "safety," this deeply
cynical strategy concentrates flights into a few narrow, low-altitude corridors to geographically isolate noise and increase carrier capacity. Claims of RNAV implementation for environmental reasons is laughable considering the increase in the number of flights planned by Logan over the next several decades - assuming it isn't under water by 2045.

Virtually all jet airline traffic is dumped onto a minority of "sacrificial neighborhoods," an already intolerable situation has deteriorated into a crisis. What this means for RNAV communities, such as those affected by runway 33L is loud aircraft noise as often as every minute or two for hours and hours, days and days at a time. Moreover, FAA and Massport have expanded operations by scheduling an increasing number of flights from 10pm through 7am without even the slightest consideration of the residents under these narrow concentrated paths. Living under RNAV means near constant noise from planes at any time of the day- 2am, 5am, 7am through the morning, afternoon and evening and starting right back up again at 5am the following morning. Many residents find it impossible to sleep during these times due to the sheer noise and vibration caused by these low, loud aircraft. This is not simply the case of a few loud planes - these planes are so low and so loud that even with an air conditioner, noise machine and earplugs the constant drone of planes can still be heard and sleep is

impossible. Would you live like this? Would you want your family to live under an RNAV flight path?

It is simply wrong to deny residents of these sacrifice neighborhoods enjoyment of their own neighborhoods, homes, yards, sleep and their happiness so that Logan Airport's executives can line their own pockets. It is simply wrong to concentrate the pollution generated from these aircraft over the same schools, homes and neighborhoods while Logan Airport's executives live far from the significant impacts that they create.

Massport must change its harmful and equitable policies:

- Disperse flights equitably to create paths over all or most Boston area neighborhoods—not just a few narrow corridors—and make that policy the central focus of Professor John Hansman's MIT Noise Study recommendations
- Mandate higher altitudes over residential areas at all times
- Eliminate noise over residential areas between 10 pm and 7 and by requiring over-water flight approaches and departures
- Move waypoints away from schools, homes, elder residences, and affordable-housing developments—working closely with representatives on the Massport Community Advisory Committee, city officials, and advocate groups to choose more suitable locations 18-1
- Eliminate NEPA loopholes enabling environmental assessments to falsely find "no significant impact" from RNAV flight paths; Work with the Joint Commission on Public Health and public health departments to investigate the health impacts of RNAV-related noise and particulate pollution
- Require significant changes in the Massport noise-complaint system to eliminate its burdens and bias

Finally, I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 18-2

Thank you.

Lisa Avery
Medford, MA

From: Edward Beuchert
To: Canaday, Anne (EEA)
Subject: Boston Logan International Airport 2017 Environmental Status and Planning Report,(EEA #3247)
Date: Monday, November 18, 2019 2:30:48 PM

Dear Ms. Canaday and Secretary Theoharides,

I urge you to reject Massport's 2017 ESPR. It's unacceptable for many reasons, but most particularly it ignores the tremendous real burdens it places on residents who live underneath the hyper-concentrated RNAV flight paths. 19-1

My family happily lived in our West Somerville home since moving here in 1998, but our lives were dramatically changed with the implementation of RNAV in 2013 -- For days at at time, we now are assaulted by loud airplanes as often as one a minute. The loud, low flying planes can start in earnest at 5 AM and continue until past midnight, followed then by "occasional" house shakers throughout the early morning hours... I work from home, but concentration is impossible on days when the planes are departing runway 33L. They vibrate our windows and shake our home, making it impossible to have conversations, sleep or even just think! The ESPR fails to recognize the serious negative health effects all the noise, air pollution and vibrations have on the residents who live in the RNAV "sacrificial neighborhoods."

In addition to that, the ESPR data is old, late and wrong. It's now late 2019 -- what about the last year's 2018 data? The 2017 ESPR predicts 1.1% annual growth in the number of flights, but 2018 figures show a 6% growth over 2017 -- So the projections were obviously completely wrong! 19-1

In 2013, the FAA and Massport claimed that the implementation of RNAV would have "no significant impact" on the communities living under the flight paths, but this has turned out to be utterly untrue in terms of what those words mean to a normal speaker of English. On October 23, 2019, after hearing from numerous citizens how terribly their lives were affected by RNAV, Somerville Mayor Curtatone, Medford Mayor Stephanie Burke and Cambridge City Manager Louis DePasquale jointly called upon the FAA and Massport to model and implement a procedure that more equitably disperses aircraft that depart runway 33L. It's widely recognized by both citizens and local leaders that there is in fact a very significant impact due to Logan aircraft noise, Massport's 2017 ESPR pretends these problems are minimal!

I ask that you please reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 19-1

Sincerely,

Edward Beuchert
15 Conwell Ave
Somerville MA, 02144

+

Board of Directors
The West Somerville Neighborhood Association
http://WestSomerville.org

From: Julia Burrell
To: Canaday, Anne (EEA)
Cc: joseph.boncore@masenate.gov; Adrian - Rep. Madaro
Subject: A Mother's Opposition to ESPR 2017
Date: Sunday, November 17, 2019 11:46:15 PM

Dear Secretary Theoharides,

First, I am writing to you as a mother.

Second, I am writing to as an East Boston resident having lived here for nearly 10 years.

Lastly, I am writing to you as a co-founder of the newly formed Mothers Out Front, East Boston chapter & member of Air, Inc.

I wanted to provide you a window into our daily experience with air pollution in our EJ community in hopes you will understand our very real fears surrounding unmitigated past airport growth and flawed future projections.

Everyday, I walk my children to school.
Everyday, we smell jet fuel and car exhaust.
Everyday, we breath in UFPs that come from aircraft and vehicular emissions.

I worry that by simply raising my children in East Boston, I am risking their longterm health. That by sending them to school in East Boston, I am risking their longterm health. By taking them to the park in East Boston, I am risking their longterm health. By walking with them to the library, I am risking their longterm health. By riding our bikes in East Boston, I am risking their longterm health.

Given the emerging research and growing body of known linking longterm exposure to UFPs to higher incidents of cardiac disease, asthma, COPD, dementia, behavioral problems, and lower IQ…I worry about the longterm harm that *increasing* air pollution will have on our East Boston children.

What will this increasing exposure do to their developing bodies…especially given the growth projections of Logan Airport in the coming years & the additional pollution associated?

With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.The last ESPR projected 3 million more passengers over 5 years, but 12M more came...It's hard to conceive that our community beared an unmitigated burdened of 9 million unexpected passengers. 20-1

MassPort hasn't managed those extra trips...so, I ask that MassPort be held accountable for those additional polluted breathes my community inhaled.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of

this ESPR's policy and mitigation strategies.

This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I implore you to reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 20-2

I ask that you do this on behalf of all East Boston residents, but specifically those most vulnerable...our children.

Sincerely,

Julia Burrell
617-877-0187
Resident, East Boston
Mothers Out Front, East Boston
Member of Air, Inc., East Boston

From: Carla Ceruzzi
To: Canaday, Anne (EEA)
Subject: MassPort ESPR - adding parking?
Date: Sunday, November 17, 2019 8:36:32 PM

Anne,

I attended a public meeting a while back summarizing the contents of the latest ESPR and was shocked to learn that a larger number of additional parking spaces are being contemplated at Logan. It seems that this is completely counter to the idea of encouraging people to get to and from the airport in other ways, and will contribute to the already very challenging traffic. I hope that there will be an opportunity to rethink this. 21-1

Sincerely,

Carla Ceruzzi
115 Saratoga Street
East Boston, MA 02128

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From: Phoebe Chadwick-Rivinus
To: Canaday, Anne (EEA)
Cc: lydia.edwards@boston.gov; joseph.boncore@masenate.gov; adrian.madaro@mahouse.gov; cis@sec.state.ma.us; MEPA (ENV); mayor@boston.gov
Subject: Opposition to ESPR 2017
Date: Thursday, October 10, 2019 7:14:47 AM

TO: Kathleen Theoharides,
Secretary Executive Office of Environmental Affairs

ATTN: Anne Canaday

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR’s policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

As a mother of a young child with asthma, I ask that you reject Massport’s request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 22-1

Sincerely,

Phoebe Chadwick-Rivinus
10 Noble Ct
Boston, MA 02128

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November 18, 2019

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Commonwealth of Massachusetts
Attn: Anne Canady EEA 3247
100 Cambridge Street, Suite 900
Boston, MA 02114

By email: anne.canaday@mass.gov

Dear Secretary Theoharides:

I am writing to request that you reject Massport's request to certify its "Boston Logan International Airport 2017 Environmental Status and Planning Report (ESPR) - EEA #3247" on the basis that

- the Report's projected growth is blatantly inaccurate, especially when compared to the FAA's estimates,
- the growth estimates do not provide details necessary to access the known disproportional increase in runway configuration use that even a small amount of growth will cause, and
- there is a pattern of sloppiness in charts and tables, every year, pointing to the need for a data audit.

Report's projected growth is blatantly inaccurate, especially when compared to the FAA's estimates

Massport's prediction for the growth in number of operations is 1.1% per year. In a recent report, the FAA's is 2.04%. That means by 2030, Massport predicts 483,509 operations per year; the FAA says it will be 540,301, a difference of almost 57,000 operations. Which is it? By then, 40% of the approaches will come over Milton, Dorchester, and South Boston, so will we have 97,000 low flying jets/year over the same homes or will it be, as the FAA predicts, 108,000? What we have now is more that we can live with. 23-1

The growth estimates do not provide details necessary to access the known disproportional increase in runway configuration use

A 2019 FAA Capacity Profile for Logan Airport shows the Runway 4r/4l/9 configuration as the only Visual Approach (80% of the time Logan is in Visual conditions) configuration at Logan that has 'room to grow' as shown by the white area in-between the cloud of points and the solid and dashed lines in the first graphic below. Compare the first graphic (the 4r/4l/9 configuration with the highest AAR rate at Logan) to the 2nd graphic (the 22L,27,22r configuration with the 2nd highest AAR rate at Logan). Where will all of this excessive growth go? Over the residents of MA already unfairly burdened by 35% of all approaches (65,000 now) to Logan and those who 23-1

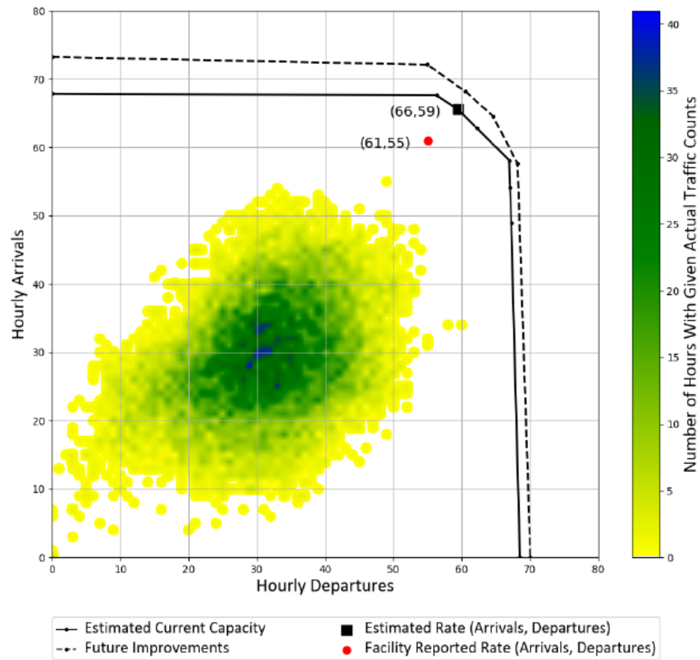
reside in Point Shirley who will get the constant departures from Runway 9. 23-1

ISUAL – NORTH FLOW

VISUAL WEATHER CONDITIONS

VISUAL APPROACHES, VISUAL SEPARATION

Type Operations	Arrival Runways	Departure Runways	Hourly Rate	
			ATC Facility-Reported	Model-Estimated
CURRENT OPERATIONS	04L,04R	04L,04R,09	116	125
FUTURE IMPROVEMENTS	04L,04R	04L,04R,09	N/A	129



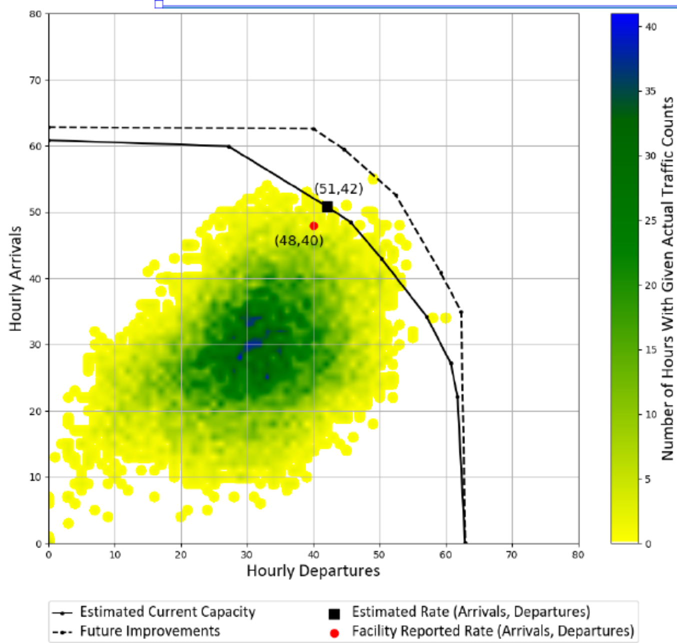
Actual traffic counts shown are for all Visual hours, all configurations.
For data source information, see page 3.

BOS Airport Capacity Profile 5

Visual Weather Conditions

Visual Approaches, Visual Separation

Type Operations	Arrival Runways	Departure Runways	Hourly Rate	
			ATC Facility-Reported	Model-Estimated
Current Operations	22L,27	22L,22R	88	93
Future Improvements	22L,27	22L,22R	N/A	104



Actual traffic counts shown are for all Visual hours, all configurations.
For data source information, see page 3.

BOS Airport Capacity Profile 7

There is a pattern of sloppiness in charts and tables in these Massport Reports, every year, pointing to the need for a data audit

Every year that Massport puts out a report, either the ESPR or an EDR, there are many errors in the tables and graphics, calling into question what parts of the report can be trusted and which are garbage. Shortly after the release of this ESPR, I wrote to Massport about an error I found with one of the Tables in Section 6. That was fixed but now I found errors in their tabled values where they claim that "Logan is more efficient, serving more passengers with fewer flights". Honestly, this year I quite looking so hard. I'm sure I could find more but I don't know why I should – Please require a data audit. Someone besides Massport needs to be checking their work. 23-1

In summary, this ESPR should not be certified. Please refuse to grant certification to this report. 23-2

Cindy L. Christiansen, PhD
59 Collamore St.
Milton, MA 02186

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From: frankiecboy@aol.com
To: Canaday, Anne (EEA)
Cc: achapdelaine@town.arlington.ma.us; jcurro@alumni.tufts.edu; dmmatheu@gmail.com; myronkassaraba@gmail.com; dcd.alist@gmail.com
Subject: espr objection
Date: Saturday, November 16, 2019 4:26:52 PM

Attn: Honorable Secretary Theohardes:

Please consider this to be an objection to your ESPR.
As the Arlington representative to the Massport CAC, I have attempted to give my Town relief from the airplane noise that resulted from the activation of RNAV.

I have been hopeful that the MIT study would offer relief and alas the options offered do not give us what i hoped for and at this point we are left with picking the lesser of impacts.I continue to hope for relief and will press for same.
I do write you now to express my concern that Logan continues to be a financial success with expansion, however, the use of runway 33L which impacts my town has soared to levels of use like never before. The use is apprx. 20% of all flights out of Logan and this is noise for my Town.

I hope you consider this with Massport because no matter what relief, if any , we receive from the MIT study, the continued expansion of Logan will hurt us... 24-1
There must be a plan to abate the noise as Massport expands and for Arlington all this was never expected. 24-2

Thank you.

Very truly yours,

frank j. ciano

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From: w.corkhum@gmail.com
To: Canaday, Anne (EEA)
Subject: Opposition t tv o ESPR 2017
Date: Saturday, October 26, 2019 10:18:08 AM

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan International Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 25-1

Sincerely,

Wendy Corkhum
142 Cliff Ave
Winthrop Ma 02152
Sent from my iPhone

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From: Darcy Devney
To: Canaday, Anne (EEA)
Subject: Boston Logan Intl Airport 2017 Environmental Status and Planning Report (EEA #3247)"
Date: Tuesday, November 19, 2019 12:21:19 PM

18 November 2019

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge St, Suite 900
Boston, MA 02114

Re: Boston Logan Intl. Airport 2017 ESPR - EEA #3247

Dear Secretary Theoharides,

I write to request that the EEA not certify Massport's 2017 ESPR, for a variety of reasons.

The 2017 ESPR is 3 years late. ESPRs are due every 5 years. The last ESPR was for 2011 (containing no data after 2010) and was released April 2013. This ESPR should have been the 2016 ESPR, should have included 5 years of data (2011, 2012, 2013, 2014, 2015) and been submitted by June 30, 2016.

Also, the vast majority of the stats in the 2017 ESPR were collected monthly or more often, and the text is often boilerplate from previous EDRs/ESPRs or other documents previously prepared. Delaying years to produce the ESPR is a calculated strategy by Massport to ignore the growth that happened in 2018 and 2019 to date, thus concealing the already obvious gap between forecasts and facts.

Simply put, increases in operations at Logan mean more negative environmental consequences. Massport devotes hundreds of pages in the 2017 ESPR to nibbling at marginal mitigation, whose impact is completely swamped by the unprecedented escalation in operations. It is re-arranging deck chairs on the Titanic. Massport is behaving like a greedy corporation, focused only on profits. Unacceptable.

With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you please reject Massport's request for certification of ESPR 2017 and 26-1

call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 26-1

Sincerely,
Darcy Devney, 110 Thorndike St., Arlington, MA 02474

From: Doylelourie
To: Canaday, Anne (EEA)
Subject: Airplane Traffic
Date: Saturday, October 19, 2019 7:00:31 AM

The Honorable Kathleen A. Theoharides, Secretary

Executive Office of Energy and Environmental Affairs

Attn: Anne Canaday, EEA 3247

100 Cambridge Street, Suite 900

Boston, Massachusetts 02114

Dear Secretary Theoharides,

We moved to our JP neighborhood in 1996. Since 2016 we have been subjected to extreme amounts of airplane traffic flying in a very low, very tight route directly overhead. This flight pattern starts at 5am and continues for 8+ hours. There can be less than a minute between noise from flights. This week the route has been used three out of five days. We are living in a noise tunnel.

The planes are so low and loud that I close my windows, turn on a white noise machine and wear hearing protector muffs to try to go back to sleep. Sometimes conditions are such that even these measures aren't able to block the noise.

I am worried about the impact this has on my family's sleep. I am worried about air pollution over my home and the neighborhood schools. 27-1

I have been contacting my elected officials for years. I have been logging weekly complaints with Massport since 2018. I have seen no results whatsoever. I have reported my experience to the FAA who suggest this is an issue for Massport. 27-2

Any response to this plea for help will be most appreciated .

Thank you,
Teresa Doyle
11 Robeson St
Jamaica Plain, Ma 02130

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From: Danielle Emond
To: Canaday, Anne (EEA)
Cc: lydia.edwards@boston.gov; joseph.boncore@masenate.gov; adrian.madaro@mahouse.gov; cis@sec.state.ma.us; MEPA (ENV); mayor@boston.gov
Subject: Opposition to ESPR 2017
Date: Wednesday, October 9, 2019 11:37:51 AM

TO: Kathleen Theoharides,
Secretary Executive Office of Environmental Affairs

ATTN: Anne Canaday

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 28-1

Sincerely,

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From:	Lindsay Falewicz
To:	Canaday, Anne (EEA)
Cc:	lydia.edwards@boston.gov; joseph.boncore@masenate.gov; adrian.madaro@mahouse.gov; cis@sec.state.ma.us; MEPA (ENV); mayor@boston.gov
Subject:	Opposition to ESPR 2017
Date:	Wednesday, October 9, 2019 11:58:14 AM

TO: Kathleen Theoharides,
Secretary Executive Office of Environmental Affairs

ATTN: Anne Canaday

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

Anyone who lives or works in East Boston knows that the traffic has become a major issue. Requesting Massport to historically report their estimates to actual growth would be a great way to see how their estimates are severely miscalculated and hold them accountable for addressing these underestimates. Further, holding Massport accountable to the health ramifications of air and noise pollution is a critical component of their presence in our community. Since living here, I have experienced a decline in my breathing function and now take long-term steroid based asthma medication to ensure my lungs function better. Our community and the future of our community deserve better than grossly misstated growth projections. 29-1 29-2

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 29-3

Sincerely,

Lindsay Falewicz
72 Cottage Street
East Boston MA 02128

Sent from my iPhone

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From: Vanessa Fazio
To: Canaday, Anne (EEA)
Cc: lydia.edwards@boston.gov; joseph.boncore@masenate.gov; Madaro, Adrian - Rep (HOU); cis@sec.state.ma.us; MEPA (ENV); mayor@boston.gov
Subject: Opposition to ESPR 2017
Date: Wednesday, October 9, 2019 10:09:04 AM

TO: Kathleen Theoharides,
Secretary Executive Office of Environmental Affairs

ATTN: Anne Canaday

Dear Secretary Theoharides,

I am a concerned Winthrop mother, writing to express my strong opposition of ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution. I do not know any child under 5 in the area that hasn't experienced some level of breathing problems, including my own two children. Something has to change.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 30-1

Sincerely,
Vanessa Fazio
--
Want to help me help kids ROCK? Donate to help keep Zumix's music and youth development programs free and low-cost for over 1,000 youth each year!

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From:	Barbara Franklin
To:	Canaday, Anne (EEA)
Subject:	Boston Logan International Airport 2017 Environmental Status and Planning Report (EEA #3247)
Date:	Monday, November 18, 2019 9:23:43 PM

he Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan Intl Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 31-1

Kind regards,
Barbara Franklin

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From: Carol Goss
To: Canaday, Anne (EEA)
Subject: comments re: Cambridge noise from Logan Airport
Date: Wednesday, November 20, 2019 2:47:09 PM

Hello there-

I apologize for my comments coming in on the late side, but I am sending them along since I have been severely impacted by the increased noise over my neighborhood. To put it bluntly, it has gotten so so bad this year that I have considered moving, which makes no sense since I am a long-time home owner in a house and neighborhood that I love and am committed to.

I could NOT sit outside my house this summer once the jets started--usually late afternoon. I would last maybe 5-10 minutes, and then retreat into my home to escape the roar of the jets...literally right over my house! This was in the summer--when most of us want to take advantage of the warm weather. But I could not. Then, when I went to bed at night? I was kept up by the roar of the jets...one after the other. This would be between 11:30 am and 1:00 or 2:00 am. I would toss and turn, with pillows over my head trying to block it out. Is this considered reasonable for one neighborhood? AND THEN.....I would finally get to sleep, and be awakened again in the early hours of the morning, getting at most 3-4 hours of sleep. The jets are still roaring over head in the early hours--waking me daily around 6:00 am. I am frequently frazzled and exhausted from this.

This is an untenable way to live. At least for me. Not to be able to sit outside in the summer. Struggle to get to sleep at night. And then be awakened a few hours later? This is such an unfair burden on one neighborhood. I can literally sit outside and count the planes as they fly over my house...one by one. One coming when I can still hear the roar of the last one!! 32-1

I have no idea what kind of feedback you are wanting to gather. This has been my experience, and a rather life-altering one. So I offer it up for what it's worth.

Thank you for your attention and consideration of my experience.

Best Regards,

Carol Goss

--
Carol Goss
Carol Goss Coaching & Consulting
LinkedIn

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From:	Anita Gryan
To:	Canaday, Anne (EEA)
Subject:	Boston Logan International Airport 2017 Environmental Status and Planning Report (EEA #3247)
Date:	Monday, November 18, 2019 9:45:20 AM

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan Intl Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 33-1

As a citizen who's location has made me and my family a victim of the current RNAV system, we are already subjected to unacceptable levels of noise pollution and fine particulate pollution that affects my health and safety in a manner that inequitably places the burden on a few neighborhoods rather than mitigating the impact of these toxins.

Sincerely,
Anita Gryan
47 Burch Street
Arlington, MA 02474

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From: Gary Gryan
To: Canaday, Anne (EEA); Anita Gryan
Subject: Boston Logan International Airport 2017 Environmental Status and Planning Report (EEA #3247)
Date: Monday, November 18, 2019 9:21:59 AM

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan Intl Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 34-1

As a household that has been chosen as a "victim" of the current RNAV system, I am bombarded with noise pollution and fine particulate pollution that affects my health and safety in a manner that inequitably places the burden on a few neighborhoods rather than mitigating the impact of these toxins.

Sincerely,
Gary Gryan
47 Burch Street
Arlington, MA 02474

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(http://www.mass.gov/orgs/department-of-public-utilities) Mass.gov | Executive Office of Energy & An official application of the Commonwealth of Massachusetts

Energy & Environmental Affairs
Public Comments Portal

anne.canaday@mass.gov

View Comment

Comment Details

EEA #/MEPA ID* 3247	**First Name** Aileen	**Address Line 1** --	**Organization** --
Comments Submit Date 10-11-2019	**Last Name** Healy	**Address Line 2** --	**Affiliation Description** Individual
Review Due By 11-8-2019	**Phone** --	**State** MASSACHUSETTS	**Status** Opened
Reviewer Anne Canaday (617) 626-1035	**Email** healy.aileen@gmail.com	**Zip Code** 02155	

Comments

Topic: Logan Airport Noise and Air Pollution

I lived in a very quiet neighborhood, which I selected when purchasing my home in1997. The Logan implementation of the RNAV has destroyed that. Now I cannot even get 5 hrs of uninterrupted sleep because of the RNAV flight path. The continual disturbance of the peace are akin to torture, making me upset and angry at what a bad neighbor Logan is. I don.t even live anywhere near the airport. I am urging Massport to remedy this by dispersing flight paths to minimize the frequency and duration of the jet engine noise. Enforce higher altitudes over suburban areas, And STOP all residential noise between 11PM and 7AM. Flights could easily be diverted to paths above 35-1
the Harbor/Atlantic Ocean during that time. Finally I would request a valid evaluation of the environmental impact of the restricted corridors have on air quality and human health. I urge Massport to be a good neighbor and abide by the same rules as all of my neighbors-do not disturb the peace. 35-2

Attachments

Update Status

Status

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From: Kathleen Higgins
To: Canaday, Anne (EEA)
Subject: Boston Logan International Airport 2017 Environmental Status and Planning Report (EEA #3247)
Date: Saturday, November 16, 2019 3:57:39 PM

Dear Ms. Canaday,

Hundreds of thousands of Boston area residents are adversely affected by Federal Aviation Administration (FAA) and Massachusetts Port Authority (Massport) NextGen RNAV flights. As the founder of Logan Aircraft Noise Working Group, I appreciate this opportunity to comment on Massport's 2017 Environmental Status and Planning Report (ESPR) for Boston Logan International Airport. Instead of responding to every detail of this Report, most of our members will focus on something we know only too well: the devastating impact of Massport's flight policies on the lives of our families and friends. FAA AND MASSPORT'S DEEPLY CYNICAL STRATEGY Massport's ESPR paints a rosy picture of Logan Airport's contribution to "strong national and regional economies" without adequately acknowledging and addressing the effects of its operations on communities beneath and adjacent to RNAV flight paths. Before these policies were rolled out on December 15, 2011, Boston area residents never could have imagined how their lives would be disrupted.

Touted as a means of promoting "efficiency" and "safety," this deeply cynical strategy concentrates flights into a few narrow, low-altitude corridors to geographically isolate noise and increase carrier capacity without raising the concerns of most citizens. Because virtually all jet airline traffic is dumped onto a minority of "sacrificial neighborhoods," an already intolerable situation has deteriorated into a crisis. This scheme—enabled by passage of the flawed Airport Noise and Capacity Act of 1990—also allows FAA, Massport, and airlines to expand operations by scheduling flights from 10 pm through 7 am. Moreover, in a deliberate misapplication of the National Environmental Policy Act (NEPA), FAA's standards for environmental assessment were shrewdly calculated to return findings of "no significant impact." Yet growing epidemiological evidence suggests a causal relationship between lowaltitude aviation traffic and impaired cognitive development in children as well as cardiovascular disease in adults. It is telling that Massport placed the first waypoint for jets departing from Runway 33L above a complex of three public schools located seven miles from Logan Airport in Medford. Hundreds of low-altitude flights pass over students on this campus, disrupting classrooms and quiet study areas. Many of these planes then head past the multi-story Medford Senior Center and Tufts University before targeting lower and upper schools, colleges, and affordable-housing developments in Arlington, Belmont, Cambridge, Malden, Melrose, Milton, Newton, Somerville, Watertown, and Winchester. Logan Aircraft Noise Working Group does not believe it is morally defensible to expose a relatively small segment of citizens—especially children, elders, and other vulnerable groups—to all jet traffic departing from a single Logan Airport runway. Residents who cannot hear planes over their homes are unwitting victims of the same particulate emissions as those whose neighborhoods are audibly bombarded by aircraft. Millions of hearts and lungs are gradually being damaged by this invisible pollution. But, because many citizens do not understand the health impacts of this exposure, they fail to file complaints with Massport. The aviation industry then uses their "silence" to justify RNAV's inequitably dispersed flights. Whether FAA and Massport admit it or not, everyone will eventually pay for this scourge on our communities through increased health costs and decreased property values.

In its next Environmental Data Report, Massport is required by law to respond to every issue raised in public comments. Members of Logan Aircraft Noise Working Group will be taking advantage of this rare opportunity to share their unique perspective as victims of FAA's and Massport's profit-centered policies. EXPECTED EFFECTS OF GLOBAL WARMING ON MASSPORT OPERATIONS In 2018, the National Oceanic and Atmospheric Administration predicted that global warming will submerge critical transportation infrastructure in coastal areas of the United States within a few decades. See U.S. Global Change Research

Program's Fourth National Climate Assessment, vol II (2018), produced by more than 300 experts from federal, state, and local governments; national laboratories, universities, and the private sector; with input from external stakeholders.

This report (https://nca2018.globalchange.gov) focuses on the human welfare, societal, and environmental elements of climate change … with particular attention paid to observed and projected risks, impacts, consideration of risk reduction, and implications under different mitigation pathways. According to documented research in the study: Throughout this century, climate change will continue to pose a risk to U.S. transportation infrastructure, with regional differences. … Sea level rise (SLR) is progressively making coastal roads and bridges more vulnerable and less reliable. … Higher sea levels will cause more severe flooding and more damage during coastal storms and hurricanes. Recent modeling shows how 1 foot of SLR combined with storm surge can result in more than 1 foot of increased storm surge. … SLR and storm surge also threaten coastal airports … [A] rise of as much as 8 feet by 2100 is scientifically plausible due to possible Antarctic Ice Sheet instabilities. Coastal infrastructure will be exposed to the effects of relative SLR, which includes vertical land motion in addition to regional variations in the distribution of the global SLR. For example, relative SLR will be higher than the global average on the East and Gulf Coasts of the United States because of the sum of these effects. … Transportation systems that are most vulnerable to the recent observed and projected increases in precipitation intensity are those where drainage is already at capacity, where projected heavy rainfall events will occur over prolonged 4 periods, and where changing winter precipitation increases transportation hazards from landslides and washouts. See https://scenarios.globalchange.gov/sea-level-rise for scenarios illustrating a range of "plausible … changes" in "local sea level rise along the entire U.S. coastline."

Given the inevitability of this future, it's time for Massport to abandon its efforts to increase
capacity at Logan Airport and focus on moving its operations far from the coast and 36-1
residents of a major metropolitan area. MASSPORT'S ETHICAL RESPONSIBILITY TO
BOSTON AREA RESIDENTS Instead of doubling down on its morally bankrupt RNAV policies,
Massport has an ethical responsibility to:

Disperse flights equitably by creating paths over all or most Boston area neighborhoods, not just a few narrow corridors, and make that policy the central focus of Professor John Hansman's MIT Noise Study recommendations;

Mandate higher altitudes over residential areas at all times;

Eliminate noise over residential areas between 10 pm and 7 am by requiring over-water
flight approaches and departures; 36-2

Move waypoints away from schools, homes, elder residences, and affordable-housing developments—working closely with representatives on the Massport Community Advisory Committee, city officials, and advocate groups to choose more suitable locations;

Eliminate NEPA loopholes enabling environmental assessments to falsely find "no significant impact" from RNAV flight paths;

Work with the Joint Commission on Public Health and public health departments to investigate the health impacts of RNAV-related noise and particulate pollution; and

Require significant changes in the Massport noise-complaint system to eliminate its burdens and bias. Thank you for providing this means for our group to share its perspective on FAA and Massport's NextGen RNAV policies.

We look forward to helping Massport develop socially responsible procedures that enhance rather than disrupt the lives of residents in the Boston area.

Thank you,
Kathleen Higgins Shea
14 Wyman Street
Medford, MA 02155
617-686-6564

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From: Martha Karchere
To: Canaday, Anne (EEA)
Subject: Airplane Pollution and Intolerable Noise
Date: Monday, November 18, 2019 4:07:35 PM

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan International Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 37-1

Sincerely,

Martha Karchere

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From:	Robert Kuhn
To:	Canaday, Anne (EEA)
Subject:	EEA #3247: Comments re Massport 2017 ESPR
Date:	Friday, November 15, 2019 3:09:53 PM
Attachments:	ESPR 2017 Unacceptable.pdf kuhn.vcf

[A pdf of the following letter is also attached to this email.]

The Honorable Kathleen A. Theoharides, Secretary 14 November 2019
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge St, Suite 900
Boston, MA 02114

Re: Boston Logan Intl. Airport 2017 ESPR - EEA #3247

Dear Secretary Theoharides,

I write to request that the EEA not certify Massport's 2017 ESPR. 38-1

Simply put, increases in operations at Logan mean more negative environmental consequences. Massport devotes hundreds of pages in the 2017 ESPR to nibbling at marginal mitigation, whose impact is completely swamped by the unprecedented escalation in operations. It is re-arranging deck chairs on the Titanic.

This ESPR is unacceptable for a variety of reasons, including:

ESPR is deliberately, inexcusably late – yet again.
The vast majority of the stats discussed in the 2017 ESPR were collected monthly or more often in 2016 and 2017. Of course, Massport continued to collect monthly stats in 2018 and 2019. Taking more than 18 months to produce the ESPR is a calculated strategy by Massport to ignore the growth that happened in 2018 and 2019 to date, thus concealing the already obvious gap between forecasts and facts. Massport's EDR/ESPRs are always late.

ESPR math is wrong.
Previous EDR/ESPRs – and the 2017 ESPR – have been wildly inaccurate. ESPR 2011 forecasts were off by almost 300% in passenger numbers. The 2017 ESPR predicts 1.1% annual growth in the number of flights, but 2018 figures show a 6% growth over 2017, which has been typical for recent years. The deliberate understatement in the ESPR of the growth rate (something Massport has been working very hard to increase) is egregious. If the EEA accepts yet another ESPR that deliberately downplays the real situation and future at Logan, it enables Massport to continue to expand with a woefully inadequate plan for mitigating negative environmental

impacts.

ESPR modeling is outrageously inaccurate.
Aircraft noise monitoring and assessment is also based entirely upon modeled data, and then "checked" against the actual field data from the noise monitors, but data adjusted to match the model. Which is contrary to accepted scientific procedures.

Massport has known for years that their noise monitor (#22 in Medford) records half the number of flights shown in their flight logs. However, on a sample day in September, the City of Medford's professional noise meter on top of the Andrews Middle School, almost directly under TEKKK (and ¼ mile from #22), registered almost every flight. Some of these 188 "ghosted" planes, such as Jet Blue 1067, registered 80 dBA. So approximately 65,000 flights were "vanished" from the data just since RNAV was implemented on R33L. Likewise, 123 N70 events in 15 hours were measured in West Medford, just outside the 20-event contour in the NA70 map. Either the #22 monitor is faulty or has been improperly tuned in such a fashion as to ignore about 50% of the plane noise events. And that's just one monitor and one runway. What about the rest of the noise from Logan? Clearly, the model needs adjustment to match more accurate collected data, rather than the other way around, in order to reflect the full reality of Logan's environmental impact. 38-2

ESPR considers each environmental factor separately.
Each change in Logan's environmental damage is negative, but the ESPR fails to comprehend the synergy of the combined effects of all changes, including RNAV. For example, it's not just that operations have expanded dramatically, it's that fleet composition has also drastically changed. Jet flights (which are heavier, louder, and more polluting) were 81% (317,370 out of 393,084) in 2018; that's actually 38,284 more jets than in 1998 (peak year), which were only 59% (279,446 out of 475,737).

ESPR neglects the known health consequences.
The ESPR fails to acknowledge the known health consequences of nighttime flights, especially given the unparalleled increase in nighttime flight operations. Nighttime flights (10pm-7am) by commercial jet operators increased 36.7% from 2013 to 2017. Note that these stats don't even include 2018 or 2019 YTD, where the same trends continue. Ironically, airplane noise is a "silent" killer, in that, like sleep apnea, people don't even realize the bodily damage being done over and over again, night after night (forthcoming Harvard Medical School research).

ESPR and MCAC.
Repeatedly, Massport deflects all problems to MCAC. While the MCAC has several very hard-working volunteers, there are only 4 full voting meetings a year, for a total of 10 hours – and that's when there is a quorum, which doesn't always happen. Further, Massport continues to stall, delay, and ignore MCAC's requests for information and changes.

Honest reporting and forecasting.

I ask that you please reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy 38-3
and mitigation responses.

Sincerely,

Robert M. Kuhn
110 Thorndike St.
Arlington, MA 02474

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From: U Kul
To: Canaday, Anne (EEA)
Subject: ESPR 2017 EEA 3247
Date: Saturday, November 16, 2019 7:09:03 PM

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan Intl Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. The future impact projections are based on unreasonably low passenger growth forecasts, hence this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8 Millionen passengers by the release of the next ESPR, in 2024. However, at the current growth rates, we can expect 14 Millionen passengers, leaving our region to deal with the impacts of 10 Millionen passengers above and beyond the scope of this ESPR's policy and mitigation strategies. These huge passenger numbers translate into many, many more flights in and out of Logan. ESPR 2017, which doesn't account for recent data either, can't provide accurate planning forecasts and follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 39-1

Sincerely,

Ursula Kullmann

377 Fellsway West, Medford, MA 02155 (within the narrow low-altitude path for departures from Runway 33L after implementation of RNAV in 2013)

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From: Richard Madden
To: Canaday, Anne (EEA)
Subject: noise pollution
Date: Saturday, November 16, 2019 11:28:43 AM

Dear Anne Canaday,

I write to advise you of my opposition to ESPR2017EEA3247. 40-1

Best regards,

Richard Madden

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Nov. 16, 2019

David Matheu
59 Everett St #2
Arlington, MA 02474
(978) 761 0797

The Honorable Kathleen A. Theoharides, Sec.
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge St. Suite 900
Boston, MA 02114

RE: Boston Logan Intl. Airport 2017 ESPR – EEA #3247

Dear Secretary Theoharides,

I am writing to request that you please ***do not certify*** Massport's 2017 ESPR. I believe it is your responsibility to reject Massport's claim to have "mitigated" their environmental and noise pollution impacts, and to hold Massport accountable for its cynical and deceptive behavior in attempting to understate, or outright hide, its current and future environmental impacts. \

I specifically urge you to reject Massport's ESPR for the following reasons: 41-1

1. Unbounded, Recruited Growth Overwhelmed All "Mitigation" Activity
Unbounded increases in Logan jet operations, especially at night, ***which were encouraged and financially recruited by Massport***, have brought major and undeniably negative consequences for Logan's host communities. Their ESPR presents a fiction that Massport's minor changes amount to "mitigation" of air pollution, and noise impacts. But those marginal activities are completely swamped by these primary Massport behaviors:

- **Major increases in total jet operations** – including a 25% increase from 2013 to 2019
- **Massive increases in overnight operations** – including a 37% increase in flights between 10 PM and 7 AM from 2013 to 2019
- **Aggressive recruitment of new flights**, especially nighttime ones. The recruitment has included financial incentives paid to airlines.
- **Assent/acceptance of continued RNAV flightpath hyper-concentration**, in part because this allows even more flight operations, and possibly, because it saves airlines money.

It is *these activities* that caused large increases in:

- NOx pollution for East Boston and nearby communities
- Excessive noise over host communities, growing now to be near constant through-the-night
- Concentration of aircraft noise onto sacrifice communities unlucky enough to be positioned under the "efficient" (for the airlines) RNAV flightpaths

If Massport actually cared about being a "good neighbor" – if it cared significantly about reducing its pollution and noise impact on the host communities that must deal with its behavior – it would have not done any of these things above. For example, over the period covered by the report, Massport **could have:**

- Rejected and/or discouraged increases in flight operations. Instead, it could have encouraged the state and region to spread operational burden to other regional airports. It could also have capped total daily flights so as never to exceed the overwater departure procedure limit at night, and establishing this as a fair capacity limit for the airport.
- Supported and helped build strong, long-term transportation options to ORH, PVD, and MHT from the region, to spread out the external cost burdens of flying.
- Rejected and discouraged, or capped, nighttime operations – even a simple program like SeaTac airport's "night-time flight shaming" program would have helped.
- Applied to the FAA for a restriction on night-time operation.
- Refused to pay airlines financial incentives for even more flights, and even more flights at night, every year.
- Demanded RNAV avoid flightpath concentration.
- Rejected RNAV's prescribed lower flight levels that were designed primarily to save airline fuel costs (saving money for the airlines is not Massport's job).

Massport did none of these things, and indicated multiple times in other ways that it did not care very much about its major and painful environmental impacts on its host communities. Instead, Massport prioritized flight operations growth over all else, and engaged in the "fig-leaf" activities indicated in the ESPR to make it appear as though it was mitigating its huge pollution and noise impacts. This claim should only deceive only those desperately wanting to be deceived.

It is your responsibility to reject Massport's claim to have "mitigated" their impacts. 41-2

2. ESPR Continues to Massively Underpredict Future Logan Operations – and Impact
Past ESPR forecasts have wildly underpredicted passenger growth – in 2011, Massport was below the actual number by a factor of 3. Such a prediction is so astonishingly wrong, and so far below the true value, as to make any ordinary citizen be very suspicious. As a secretary with oversight power, you should be even more so.

Again, ESPR predictions in the 2017 report are likely to be massively underpredicting the true operational growth they are planning for. The 2017 ESPR predicts 1.1% annual growth – but actual growth in 2018 was over 6%. This time they were off by a factor of 6.

Adding to this deceptive stragety is Massport's delaying of the 2017 report until 2019. This has the effect of hiding major increases in impacts in 2018 and 2019.

2

Deceiving the public or an oversight authority by embarrassingly off "predictions" is unacceptable. Massport is doing this in order to prevent the public, and especially its host communities, from understand just how awful their future operational impacts are going to be.

Please do not accept the ESPR until Massport can account for why, in every situation where they must do this, they massively underpredict passenger load and growth for Logan. Demand that Massport use real predictions vetted by an outside authority. Please prevent Massport from deceiving the public this way. 41-1

3. ESPR Modeling is Inaccurate, Allowing Significant Underreporting of Impacts 41-2

ESPR uses modeled data for noise impacts that then is allegedly "checked" against actual field data from noise monitors. But the noise monitors are ignoring a great deal of overflight noise.

For example, Massport has known for years that noise monitor #22 in Medford records only half the overflights shown in their logs. To demonstrate this, the City of Medford installed a professional noise meter on top of the Andrews Middle School, which is directly under the TEKKK waypoint. This monitor registered every single overflight, with many measurements of noise exceeding 80 dBA.

This is one monitor and one runway (33L). The model needs to be adjusted to match real noise monitor data – **without Massport interfering or controlling the monitors to skip or ignore overflights.**

There is other evidence of deception in its use of noise data, models, and maps. In one instance, 123 "N70" events were recorded in a 15 hour period in West Medford – which is outside the 20-event contour of Massport's N70 map. **How is it possible that the contour map so greatly understates the actual noise impacts?** 41-2

Again, the ESPR hides Massport's pattern of massive underreporting of actual noise impacts in host communities.

Massport must be forced to turn over noise monitoring, and noise modeling, to a disinterested third party that does not directly benefit from increased operations. Until they do, you must reject any ESPR from this entity. 41-2

4. ESPR Impact Reporting is Deceptive in Other Ways 41-3

To cite one example – Massport states (in this report and in its public presentation) that "flight operations in 2017 are lower than the peak year of 1998." This is an extremely deceptive statement. It is technically true – but *jet operations*, which generate the vast majority of noise and pollution impacts – increased greatly since 1998. In 2018 Massport saw 317,000 jet operations; in 1998 this number was 279,000.

Please reject Massport's ESPR until includes honest reporting of their impacts.

5. Massport Refers Problems to MCAC, Which Has Little Power over Massport
When citizens can reach Massport to complain about the vastly increasing negative impacts of its operations, Massport likes to refer them to "your community MCAC representative" – who is generally an unpaid volunteer.

The MCAC has many dedicated representatives. But by flooding these individuals with jargon, and with the same deceptive reporting behaviors we see in the ESPR, they wear out these representatives. By this kind of stonewalling they may hope to drive the representatives to giving up on oversight or meaningful changes – and it's working. Our town's MCAC recently has said repeatedly, "I can't deal with this anymore", and has noted the way in which Massport has worn him down.

Massport continues to stall, delay, or simply ignore the requests and recommendations that MCAC produces. This must stop. At a minimum, you must reject ESPR until this behavior changes. Massport must allow MCAC real authority, as representatives of the host communities. It must be accountable for schedules by which it will answer requests, take actions, and fix problems – like any real public authority.

If you accept the ESPR, you are telling Massport it is free to continue working as an effective subsidiary of the airline industry, with no accountability to the host communities that bear the painful consequences of its actions.

6. Massport Ignores The Health Consequences of Concentrated Noise Pollution 41-4
Massport's cheerful acceptance of the 2013 RNAV program allowed the hyper-concentration of flightpaths over unlucky host neighborhoods, including directly over our former home in Somerville. After years of ever-increasing, through-the-night "pounding", of flight-after-flight noise (1 event > 60 dB every 90 to 120 seconds, for hours or even days), we were finally forced to move. To do this, we had to tear up our young son's blossoming friendships with the children of his neighborhood, greatly lengthen one of our commutes, and bear other sacrifices, just to get out from under the air attacks.

4

And we now worry that Massport will add even more flights, possibly over our new location, as it continues to drive hard at the only things it truly cares about – more flights, and more flights at night.

We are not the only ones, nor the ones suffering the most. Repeated, endless airplane noise is likely to be a "silent killer". Victims don't easily realize the slow damage done by the chronic sleeplessness and anxiety brought about by repeating night-time air noise. We hope that the upcoming Harvard Medical School study will make this clearer. But enough is known now that you would have plenty of strong ground, on this basis alone, to reject Massport's ESPR.

7. Massport Ignores Skyrocketing Noise Complaints

Since 2013 there has been a massive upsurge in noise complaints to Massport – 10's of thousands more per year. The ESPR essentially ignores this. Any accountable public agency would never be allowed to ignore so dramatic an increase in pollution complaints from individual citizens. Why is Massport allowed to get away with this in its ESPR?

8. Massport Is Externalizing the Negative Consequences of Flying, Onto Its Hosts

The ESPR covers up the fact that Massport has engaged, for at least 10 years, in externalizing the negative costs of flying onto its host communities, while reaping the profits and income for itself and its staff. The head of Massport is paid more than $300,000/yr. Such high salaries require lots of flight activity to be sustained.

But no one at Massport, nor its airline industry clients, ever receive a substantial negative consequences for adding more and more flights, at night or any other time, every year.

This is unacceptable. **Flyers and airlines must bear the true costs of flying.** Massport, working the FAA, externalizes the noise pollution and other costs of flying onto communities like ours, while it profits greatly from the same. Both of these institutions (Massport, and the FAA) have enormous unchecked power, as awarded to them by the State of Massachusetts and the U.S. Congress – and because of this they are accustomed to never being really checked or stopped. **But your rejection of its ESPR may actually do something to help correct this behavior.**

PLEASE REJECT THE MASSPORT ESPR

By rejecting this deceptive and cynical report, you can hold Massport accountable for the enormous negative impacts it forces upon its host communities. You will help to give Massport some badly-needed constraint -- a priority other than "more flights no matter what, and no matter who gets hurt".

Your step here could be extremely positive for so many of us. It will reduce suffering of the citizens of the Commonwealth, and will likely save lives.

Sincerely,

David M Watts

5

David Matheu
59 Everett St Unit 2
Arlington, MA 02474

6

November 17, 2019
The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Commonwealth of Massachusetts
Attn: Anne Canady EEA 3247
100 Cambridge Street, Suite 900
Boston, MA 02114

By email: anne.canaday@mass.gov

Dear Secretary Theoharides:

I am writing to request that you reject Massport's request to certify its "Boston Logan International Airport 2017 Environmental Status and Planning Report (ESPR) - EEA #3247" on the basis that the existing negative public health and environmental impacts of Logan Airport's recent and major changes to flight path configurations have not yet been acknowledged or resolved. It is irresponsible, when a segment of Massachusetts residents are potentially being exposed to unknown but greatly increased harms, to even consider the agency's proposed schedule for growth in the airport's passenger and cargo traffic.

Since 2011 to 2013, when the Federal Aviation Administration's (FAA) NextGen program began to be implemented at Logan Airport, the pattern of air traffic over the entire Boston region sharply changed. Instead of being spread out in a relatively equitable distribution for all residents, arriving and departing aircraft were channeled into six super-concentrated RNAV (area navigation) flight paths, 0.5 nautical miles wide, each of which splits or terminates into just a few tracks.

This policy has unfairly shifted the noise, disruption, and pollution burden for Logan Airport from the entire Boston area population to the unlucky few

who live, work, attend school, or pursue outdoor activities under the flight paths and tracks. These residents, of which I am one, are literally tortured by incessant overhead aircraft—up to 400 a day—often at low altitudes and during community quiet hours, 10 pm - 7 am. As an example, since 2013, when the 33L RNAV was made operational, approximately 120,000 planes have passed over my house in northwest Cambridge—and I am not even under the main trunk!

(That implementing NextGen's super-concentrated flight paths was found by the FAA's environmental reviews to have no significant impact (FONSI) was only made possible by a cynical reliance on a forty-year-old metric, DNL (day-night sound level), well known not to capture any level of public distress, and a cynical designation of the entire 1500-square-mile Boston region as the "affected environment " for the reviews rather than the approximately 20 square miles truly affected by the new flight paths.)

Even with the finding of no significant impact, Massport's environmental reviews made and make many disturbing omissions and elisions, failing to provide any specific public health and environmental information related to concentrated flight paths. Without evidence that these impacts are not, in fact, injurious to the public, it's hard to understand how the FAA and Massport could go ahead with such a profound change.

I hereby request that the Massachusetts Environmental Protection Agency require that Massport provide detailed information for two general categories of concerns:

1. **Public health research on concentrated flight paths, and** 42-1

2. **Gaseous and particulate emissions exposure data/estimates for concentrated flight paths.**

Public Health Research on Concentrated Flight Paths

For each of the health impacts listed below, please provide a detailed bibliography of studies done under concentrated flight paths and synopsis of findings, including whether the effect was found to be related to exposure to noise, gaseous emissions, particulates, and/or ultrafine particulates. If for a potential public health impact, no research has been done for its prevalence and severity in areas under concentrated flight paths, but has been done for those living in proximity to a runway, please provide these as a substitute, noting that there is as of-yet no specific research on the topic. 42-1

Potential Public Health Impacts of Concentrated Flight Paths

Preterm birth, prenatal development issues, low birth weight
Learning impairments (children and youth)
Asthma and respiratory problems
CVD and elevated heart attack risk
High blood pressure and elevated stroke risk
Anxiety and other mental health impairments
Interrupted and decreased sleep
Premature death

Gaseous and Particulate Emissions Exposure Data/Estimates for Concentrated Flight Paths

According to Massport data for runway use since 2013, approximately 120,000 aircraft have passed over my home, which, during that period, included three children and a disabled elder. Can Massport calculate for a single aircraft (with the intent of estimating an approximately total exposure over time) an exposure range of various pollutants at 1, 2 and 3 nautical miles from the flight path or track and at 2000 and 3000 feet altitude for the 42-2

following (and any other known aviation-related pollutants that may have been inadvertently omitted from this list)?

Gaseous and Particulate Pollutants Under Concentrated Flight Paths

Known Pollutants (Regulated)
Noise (please provide all DNL values above zero (0) as well as any alternative noise metrics available)
Carbon monoxide
Hydrocarbons
Nitrogen oxides
Ozone
Particulates
Emerging Pollutants (Unregulated)
Ultrafine particulates (smaller than 100 nm)

42-2

Based on my understanding of the above, I believe there is insufficient information about the short and long-term public health and environmental impacts of the noise, disruption, and pollution from super-concentrated RNAV flight paths to justify their continued use, let alone allow further growth of air traffic at Logan Airport.

Please reject Massport's request that you certify Logan Airport's 2017 ESPR EEA #3247.

Sincerely,

Anastacia Marx de Salcedo
Cambridge, Massachusetts
anastaciamdes@gmail.com

From: Catherine McNeil
To: Canaday, Anne (EEA)
Subject: Opposition to ESPR 2017
Date: Friday, November 22, 2019 1:47:00 PM

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan International Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a 43-1
Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. Only a small area of our town has been sacrificed to Massport with the blessings and undue secrecy of our Select Board that refuses public meetings and discussions . We are the only town in this area that is doing this. All the other impacted towns have open meetings and public discussions. The planes are now almost right over my head about one house away. There is enough wrong with the FAA and misleading statistics but our select board seems to be colluding with them. My backyard is now unusable due to the plane noise. At least we need to demand they tell the truth!

Sincerely,
Cathy McNeil
9' Waldeck Rd.
Milton, Ma. 02186
617 698 0154

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From: Meredith Shannon
To: Canaday, Anne (EEA)
Subject: Comment of Air Traffic Noise
Date: Wednesday, November 13, 2019 3:06:03 PM

Hi Anne,

I am submitting a comment here regarding air traffic noise. I own a condo in Cambridgeport near Chroma and air traffic noise has increased significantly since I moved in 4 years ago. For me the noise has had a direct impact on my quality of life. I wake up because of plane and helicopter noise very frequently. During the day, the air traffic is often so loud that it causes me a great deal of anxiety/panic until I can hear the aircraft moving away in the distance. While most of the time I feel like a live in a relatively quiet part of Cambridge, sometimes when there is a lot of place activity it sounds like a military zone with jets flying directly over head. 44-1

I know people like my husband who don't mind the noise at all but for me it is very stress inducing and something I hope gets at least better someday.

Best,
Meredith McSorley
68 Allston Street

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From: Ryan C. Miller
To: Canaday, Anne (EEA)
Cc: Adrian.Madaro@mahouse.gov; Joseph.Boncore@masenate.gov
Date: Sunday, November 17, 2019 5:46:00 PM

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan International Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 45-1

Sincerely,

Ryan C. Miller
East Boston, MA Resident
--
Ryan C. Miller | 617.631.7335

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From: Sheila Mooney
To: Canaday, Anne (EEA)
Subject: Boston Logan International Airport 2017 Environmental Status and Planning Report (EEA# 3247)
Date: Sunday, November 17, 2019 10:54:16 PM

Dear Secretary Theoharides,

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 46-1

Sincerely,
Sheila Mooney
55 Brookside Avenue
Belmont Massachusetts
02478

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From: Rosalind Mott
To: Canaday, Anne (EEA)
Subject: ESPR Opposition
Date: Saturday, November 9, 2019 11:09:35 AM

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan International Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution. **Allowing unmitigated expansion to happen will have major consequences for the health of our citizens.**

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. (*it is difficult to wrap my mind around this type of growth when considering how Logan is situated within our communities*) This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded **unhealthy noise and pollution** throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 47-1

Sincerely,
Rosalind

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From: Fabricio Paes
To: Canaday, Anne (EEA)
Cc: lydia.edwards@boston.gov; joseph.boncore@masenate.gov; adrian.madaro@mahouse.gov; cis@sec.state.ma.us; MEPA (ENV); mayor@boston.gov
Subject: Opposition to ESPR 2017
Date: Thursday, October 10, 2019 8:47:11 AM

TO: Kathleen Theoharides,
Secretary Executive Office of Environmental Affairs

ATTN: Anne Canaday

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 48-1

Sincerely,

Fabricio Paes

432 Meridian St #3
East Boston, MA 02128

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From:	Gabriela Perry
To:	Canaday, Anne (EEA)
Cc:	lydia.edwards@boston.gov; joseph.boncore@masenate.gov; adrian.madaro@mahouse.gov; cis@sec.state.ma.us; MEPA (ENV); mayor@boston.gov
Subject:	Opposition to ESPR 2017
Date:	Wednesday, October 9, 2019 6:25:34 PM

TO: Kathleen Theoharides,
Secretary Executive Office of Environmental Affairs

ATTN: Anne Canaday

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

Further, the daily congested streets in the neighborhood hinder the livelihood of the entire community. Our children are late to school, working adults, parents, etc are late for work. The Blue T line is at maximum capacity. Traffic stemming from Massport growing parking lots, from the north shore commuters, and more residents moving to East Boston to the new residential developments, that only continue to grow, and the airport adding more flights, etc., it is all affecting the residents of East Boston in the most negative neglect ever seen by our local government.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 49-1

Sincerely,

Gaby Perry
East Boston Resident

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From: JP Petriello
To: Canaday, Anne (EEA)
Subject: "Boston Logan International Airport 2017 Environmental Status and Planning Report (EEA #3247)."
Date: Monday, November 18, 2019 10:09:49 AM

Hello Anne,

Could you verify that these comments were received and will be added to the Logan ESPR?
Thanks, Jessica Petriello

Please provide a list of the names, street address and municipality) of all of senior housing (nursing homes, assisted living, rehabilitation and other similar housing) whose location puts them under all current RNAV flight paths. Please also provide the number of residents at these facilities broken out by facility name, street address, and municipality, as well as total number of residents overall.

Please list the locations (street address and municipality) of all of low-income housing (public, Section 8, and other similar housing) that are under all current RNAV flight paths. Please also provide the number of residents to broken out by building name (or other), street address, and municipality, as well as total number of residents overall. 50-1

Please provide a list of the names, street address and municipality) of all of senior housing (nursing homes, assisted living, rehabilitation and other similar housing) whose location puts them under all current RNAV flight paths. Please also provide the number of residents at these facilities broken out by facility name, street address, and municipality, as well as total number of residents overall,

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From: Thomas Phipps
To: Canaday, Anne (EEA)
Subject: Boston Logan International Airport 2017Eenvironmental Status and Planning Report (EEA#3247)
Date: Sunday, November 17, 2019 9:33:41 PM

Dear Secretary Theoharides,

I live at 150 Park Street in Medford Massachusetts and I am writing to ask you not to accept Massport's report EEA#3247. Massport continue to claim that the policy of sending low flying planes over narrow flight paths has no adverse environmental effects. However, nothing could be further from the truth. For those of us living under theses fight paths life has become a constant torment. Regularly planes start going over before 6.00am and continue at a rate of only seconds apart at times. It is not unusual for me to look out my window and see the plane going over my home and also be able to see the next plane approaching and that the plane that has just gone over. This can continue all day till after midnight. Then there is a lull till 1.30am when another plane goes over that wakes me up and if I am lucky enough to get back to sleep I am woken by another plane at 4.30am. Then it all starts again between 5.30-6.00am. This pattern repeats for days and even weeks at a time and I consider myself luck if I get a couple of days respite before it starts again. I live in a constant state of sleep deprivation and feel living under these conditions is detrimental to my physical and emotional well being. 51-1

Massport will insist that their research proves there is not negative effect on the people under these low narrow flight paths but that is simply not true. The thousands of complaints lodged by people like myself prove that. Prior to the introduction of these new system complaints for my city, Medford, were annually in the single digits now the monthly totals are well over a thousand.

Please do something to help the thousands of people who are adversely affected by this unfair system. 51-2

Thanking you in advance for you help,

Thomas Phipps

Sent from Mail for Windows 10

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From: Kathleen Rourke
To: Canaday, Anne (EEA)
Subject: : Boston Logan International Airport 2017 Environmental Status and Planning Report (EEA #3247)
Date: Monday, November 4, 2019 10:19:47 AM

Dear Ms. Canaday,

I am writing to you as a resident of Medford whose family has been severely negatively impacted by the implementation of RNAV/NEXTGEN which concentrates low flying aircraft over our home. We have lived in our home for 13 years and expected some air traffic given our proximity to the Logan, but the past few years have been untenable. This past Friday (Nov, 1) 379+ aircraft passed directly over our home. The planes are so low, that I can read the logos on the bottom and sometimes the sides of the aircraft. Because the waypoint for runway 33L is positioned over the Medford school campus (3 schools 1,500 students) – each one of these planes passed over the schools that day, as well. Today, Monday (Nov 4) the airplanes are still assaulting us. They began at 2:09 am and then started up full force at 5:15 am. It is difficult to explain how terrible this situation is, unless you experience it. Yesterday, while attempting to help my daughter with her homework, I broke down and cried. It had been nearly 3 days of constant noise and distraction and we couldn't converse in our own homes. It has taken a toll on our health mentally, emotionally and physically. We are tired and on edge. The FAA has unfairly targeted a certain population to sacrifice for their own ends. The benefit is to no one but the FAA, Massport and the airlines. Why is Logan Airport allowed to expand operations and increase air travel given the amount of research studies showing the impact of air travel on greenhouse gasses and global warming? 52-2

I am not sure what more to do. We don't want to move. We love our home and our neighborhood. We are invested in our community, but I worry about the impact of the air pollution and noise pollution from the aircraft on myself and my family. We are really at a point of desperation. There are thousands of us who are suffering this experience in Medford, Maldon, Somerville, and Cambridge.

I am hoping you may be able to help us.

Many thanks,
Kathleen Rourke

From: Kathleen Rourke
To: Canaday, Anne (EEA)
Subject: Boston Logan International Airport 2017 Environmental Status and Planning Report (EEA #3247)
Date: Friday, November 15, 2019 3:18:08 PM

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan Intl Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses . The current policy and airport expansion of Logan Airport is destroying our community, my family's health and quality of life and furthering global warming. 52-1

Respectfully,
Kathleen Rourke

.

Letter #53
Boston Logan International Airport 2018/2019 EDR

Energy & Environmental Affairs
Public Comments Portal

anne.canaday@mass.gov

View Comment

Comment Details

EEA #/MEPA ID*
3247

Comments

Submit Date
11-18-2019

Review Due By
11-25-2019

Reviewer
Anne Canaday
(617) 626-1035

First Name
Bill

Last Name
Schmidt

Phone
--

Email
billy.schmidt123@verizon.net

Address Line 1
32 buchanan street

Address Line 2
--

State
MASSACHUSETTS

Zip Code
02152

Organization
Winthrop Board of Health

Affiliation

Description
Municipality

Status
Opened

Comments

Topic: Boston Logan International Airport

The Honorable Kathleen A. Theoharides, Secretary Executive Office of Energy and Environmental Affairs Attn: Anne Canady EEA #3247 100 Cambridge Street, Suite 900 Boston, MA 02114 Re: Boston-Logan International Airport 2017 ESPR - EEA #3247 Dear Secretary Theoharides: As the Chair of the Winthrop Board of Health, I am pleased to have the opportunity to submit comments on the Boston-Logan International Airport 2017 Environmental Status and Planning Report (ESPR). Passenger Growth: As noted in the ESPR, Logan Airport is one of the fastest growing major U. S. airports in terms of number of passengers over the past several years. In addition, the number of aircraft operations has increased. The Town of Winthrop is greatly and adversely affected by these increases. Ground Access/TNCs and HOV Strategies: The number of Transportation Network Companies (TNCs) such as Lyft and Uber are now significant providers of Logan Airport passenger ground access/egress. I have concerns that Massport has not done enough to reduce the daily

TNC operations, nor implemented enough high occupancy vehicle (HOV) alternatives. These TNCs! have an adverse effect on the environment and the Winthrop community. Emission Reduction: As! noted in the ESPR, It is important to protect public health, the environment, and quality of life from! the detrimental effects of air pollution. While Massport has implemented emission reduction! strategies in its buildings and vehicles, the largest emissions culprit at the airfield is aircraft. This! aircraft directly impacts the lives of Winthrop residents. Massport should take a leading effort in our! nation to advocate for new planes with significantly lower emissions. 53-1 Noise Abatement: Noise! abatement strategies implemented by Massport and the FAA are woefully inadequate given the! impact that noise exposure has on the community of Winthrop, particularly the residents of the Point! Shirley and Court Road areas. Massport needs to work with the airlines on noise-reducing! measures and commit to further expenditures for insulation of affected homes in the community.! 53-2 Day-Night Sound Level (DNL) exposure above 65 decibels (dBs) are considered to be incompatible! with residential land use. Mitigation Efforts: Massport needs to increase the mitigation efforts! towards Winthrop and other surrounding communities that are so greatly impacted by airport! operations, planned expansion activities at Logan Airport, and passenger transportation to and from! the airport. If Massport wants to be a good neighbor, it needs to provide more to its neighbors given! the tremendous adverse impact it has on people's lives. 53-1 I appreciate the MEPA Office's! consideration of these concerns and look forward to your efforts to address them. Sincerely, Bill! Schmidt Chair, Winthrop Board of Health

Attachments

Update Status

Status

2: 4

Submit

Share Comment

Canaday, Anne (EEA)

From: noel scott <noelscottremodeling@gmail.com>
Sent: Sunday, September 29, 2019 11:41 AM
To: Canaday, Anne (EEA)
Subject: 3247 - Logan

To whom it concerns ,

I am writing to complain about air traffic over traffic :
Specifically :

1. The rapid escalation in air traffic volume

2. The noise created by air traffic 54-1

3. The way point directly over the middle school

4. The low flight patterns .

Noel Scott
20 Logan ave
Medford
Ma 02155.

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From: claire silvers
To: Canaday, Anne (EEA)
Subject: Boston Logan International Airport 2017 Environmental Status and Planning Report EEA #3247
Date: Monday, November 18, 2019 9:44:34 AM

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 55-1

Claire Silvers and Mark Feeney
26 Mead Street
Cambridge, MA 02140

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From:	Danielle Simbajon
To:	Canaday, Anne (EEA)
Subject:	Boston Logan International Airport 2017 Environmental Status and Planning Report (EEA #3247)
Date:	Friday, November 15, 2019 3:13:18 PM

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan Intl Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 56-1

Sincerely,
Danielle Simbajon
Medford, MA
978.766.3803

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From: DeNee Reiton Skipper
To: Canaday, Anne (EEA)
Subject: Boston Logan International Airport 2017 Environmental Status and Planning Report (EEA #3247)
Date: Monday, November 18, 2019 10:27:41 AM

To All Whom It May Concern:

Belmont is a small town with three(!) air traffic routes over its skies. This is quite unbearable as it is, and enlarging Logan's capacity for more air traffic is a fearsome prospect for those of us on the ground. The noise drives many of us inside on nice summer days, because we cannot hear one another in a conversation outside. Sometimes that applies to inside as well.

The RNAV system certainly placed the burden for all the noise on a few of us, rather than the dispersal that existed before. I truly hope Logan will not continue to grow and grow, without a care for those of us who live nearby. 57-1

Sincerely,

DeNee Skipper
Belmont, MA

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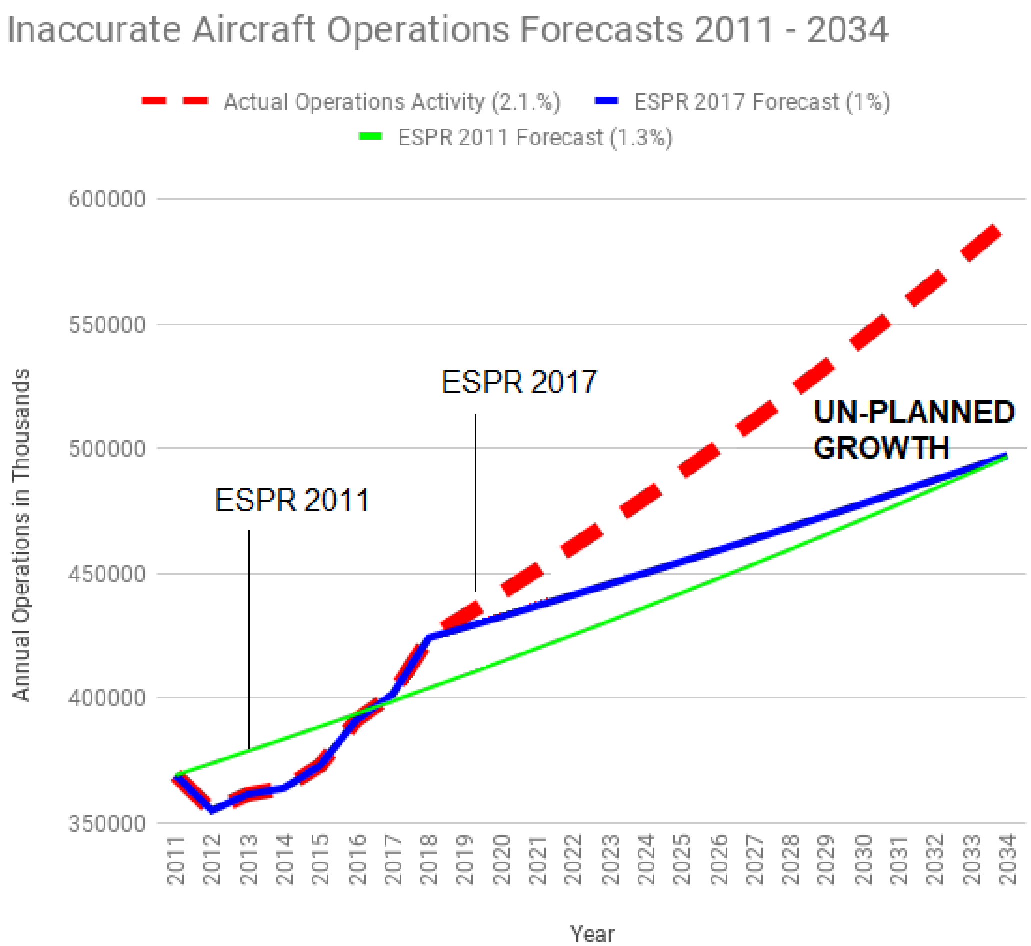
From:	Nat Taylor
To:	Canaday, Anne (EEA)
Cc:	lydia.edwards@boston.gov; joseph.boncore@masenate.gov; adrian.madaro@mahouse.gov; cis@sec.state.ma.us; MEPA (ENV); mayor@boston.gov
Subject:	Opposition to ESPR 2017
Date:	Thursday, October 10, 2019 10:30:08 AM
Attachments:	image.png

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan International Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my opposition to certification of ESPR 2017 EEA 3247 because of its unrealistically low passenger growth forecast. The following chart is what convinced me because it show's that ESPR 2011 grossly under forecasted growth which has already led to acute environmental impacts and that ESPR 2017 appears to be equally flawed. Therefore it is not worthy of being certified for the purpose of planning.



Last Sunday I walked down Frankfort St just a few blocks from the airport and overheard part of a dialog between two longtime residents. They were remarking about of the effects of the tens of thousands of Airport deadhead TNC trips and lamenting their ever worsening commutes on Route 1A, concluding that they would soon have to leave their homes in East Boston.

Almost every day outside my home on Cottage St I am nuisanced by the noise and pollution of Airport TNCs attempting to cut through my neighborhood on their way to and from the Airport.

I believe that certifying ESPR 2017 EEA 3247 would be a failure of the Office to fulfill its mission "to make Massachusetts a wonderful place to live, work, and raise a family," because the unrealistically low passenger growth forecast would worsen these problems.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 58-1

Sincerely,
Nat Taylor

nattaylor@gmail.com
158 Cottage St 1R
East Boston, MA 02128

Creator, Analyze Boston SQL Client
Secretary, Gove Street Citizens Association
Friend, East Boston Greenway
Supporter, Clean Boston

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From:	Kannan Thiru
To:	Canaday, Anne (EEA); Theoharides, Kathleen (EEA)
Cc:	Lydia Edwards; Joseph Boncore; Adrian C. Madaro (HOU); cis@sec.state.ma.us; MEPA (ENV); mayor@boston.gov
Subject:	Opposition to ESPR 2017
Date:	Thursday, October 10, 2019 9:30:04 AM

TO: Kathleen Theoharides,
Secretary Executive Office of Environmental Affairs

ATTN: Anne Canaday

Dear Secretary Theoharides,

Hope you are well. **I am delighted that you are our Secretary of Environmental Affairs.** I am the guy who runs a small urban farm in East Boston. Back in 2016 you kindly gave me more than 30 minutes of your time. We spoke on the phone. You gave me some very good pointers. I appreciate that and I enjoyed our conversation, as another person with a long last name (and coincidentally the same initials!) :)

Without good data, good science cannot be done. On the topic of inaccurate data and underestimates, you may be interested in this ongoing meeting: https://blog.ucsusa.org/gretchen-goldman/what-to-expect-at-the-independent-particulate-matter-review-panel-meeting

As a resident of East Boston and as someone who grows food in the neighborhood for the community (especially those in food insecurity), I am writing to express my opposition to ESPR 2017 EEA 3247 which lacks good data and good analysis. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 59-1

Sincerely,
Kannan Thiruvengadam
213 Webster Street, Boston, MA 02128

--
Kannan Thiruvengadam
Host, Zumix Radio
Director, Eastie Farm
Director, JP Green House

From: Mary Tittmann
To: Canaday, Anne (EEA)
Subject: Logan"s ESPR
Date: Saturday, November 16, 2019 3:24:05 PM

Dear Secretary Canaday,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

As a resident who is hugely affected by take offs from runway 33L any increase in traffic, particularly international flights that often take off until the early morning hours, without Logan, MassPort, the FAA and your Executive Office to mitigate the noise is untenable. The MIT noise study has been years in the making yet we have seen no relief. I believe the only recourse, besides requiring noise mitigation for aircraft, which I am sure the airlines will fight vociferously, is to disperse flights rather than relying on the RNAV system. 60-1

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 60-2

Thank you,
Mary Tittmann
29 R C Kelley Street
Cambridge MA 02138

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Nancy S. Timmerman, P.E.
Consultant in Acoustics and Noise Control
25 Upton Street
Boston, MA 02118-1609
(617)-266-2595 (Phone) ; (617)-645-0703 (Cell)
nancy.timmerman@alum.mit.edu
nancy_timmerman@comcast.net

November 18, 2019

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office
Anne Canaday, EOEA No. 3247
100 Cambridge Street, Suite 900
Boston, MA 02114

Subject: EOEA No. 3247 – Boston-Logan Airport 2017 Environmental Status and Planning Report (ESPR)

Dear Secretary Theoharides:

These comments are being transmitted by email. I have reviewed the 2017 Environmental Status and Planning Report (ESPR), EOEA #3247 and offer the following comments and questions.

On page 3-30, Figure 3-7, Massport discusses the development of airport edge buffers, to reduce noise in adjacent communities. NOMS Sites 9 and 30, on Bayswater Street and at Piers Park in East Boston, appear to be affected in this way.

This reviewer has provided a Table (attached) comparing measured versus modeled for 2017 (Pages 6-40 and Table 6-10) along with their thresholds on page B-115 (response to P9-3) for locations for which the modeled – measured was positive or large. This was done because NMS Sites 3 and 4 should be very well modeled, since they are directly under the flight paths. In recent years, there has been a discrepancy. The differences between the threshold and modeled levels were also computed. In these cases, the threshold is larger than the modeled level. This is also true for some communities farther out, including Milton, Lynn, Everett, Jamaica Plain, and Mattapan. 61-1

Your Noise Monitoring System should be able to provide to a complainant the level measured at the nearest site at the time of the complaint. This is essential to the airport's credibility. 61-2

Thank you for the opportunity to comment on this report.

Sincerely,

Nancy S. Timmerman, P.E.

Cc: S. Dalzell, MPA

NMS	Threshold (dBA)	Event Min Duration (sec.)	Thresh - Mod	2017 Meas	2017 Mod	Mod - Meas	
1	70	0:10					
2	68	0:10					
3	65	0:10	4	59	61	2	
4	75	0:10	3	71	72	1	
5	65	0:10					
6	68	0:10					
7	70	0:10					
8	68	0:10	8	58	60	2	
9	73	0:10	6	61	67	6	**
10	70	0:10					
11	65	0:10	8	54	57	3	
12	70	0:10					
13	68	0:10					
14	65	0:10					
15	68	0:10					
16	70	0:10					
17	65	0:10					
18	65	0:10					
19	65	0:10					
20	63	0:10	8	52	55	3	
21	65	0:10	7	55	58	3	
22	63	0:10					
23	65	0:10					
24	63	0:10	11	48	52	4	
25	63	0:10	13	40	50	10	
26	65	0:10					
27	65	0:10					
28	60	0:10	12	51	52	1	
29	65	0:10	16	43	49	7	*
30	63	0:10	4	51	59	8	**

* Rounding

From Page B-115

** Sites 9 & 30 are behind a buffer/P 3-31

Table: Comparison of 2017 NOMS Meas vs Mod & Thresh

From: Karla Torres-Welch
To: Canaday, Anne (EEA)
Cc: lydia.edwards@boston.gov; joseph.boncore@masenate.gov; adrian.madaro@mahouse.gov; cis@sec.state.ma.us; MEPA (ENV); mayor@boston.gov
Subject: Opposition to ESPR 2017
Date: Wednesday, October 9, 2019 11:41:30 AM

TO: Kathleen Theoharides,
Secretary Executive Office of Environmental Affairs

ATTN: Anne Canaday

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 62-1

It is important that we work on resolving this matter now, especially with the level of growth that East Boston is experiencing and more importantly the health and development of the resident children.

Please support this effort.

Sincerely,

Karla Torres-Welch
Sent from my iPhone

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From: Bill
To: Canaday, Anne (EEA)
Subject: Boston Logan 2017 ESPR EEA #3247: inaccurate and misleading
Date: Monday, November 18, 2019 3:35:53 PM

To

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts

The conclusions of the ESPR 2017 EEA 3247 are inaccurate and will lead to unaccounted for increases in noise, traffic, and pollution. Logan and the FAA have already destroyed the ability of thousands to live in peace due to NextGen, and you are seemingly intent on continuing to do that with this report

- ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years.
- This rate of growth implies an increase of **3.8M** passengers by the release of the next ESPR, in 2024.
- However, at *current growth rates*, **14M passengers will come,** leaving our region to deal with the impacts of **10M passengers above and beyond the scope of this ESPR'**s policy and mitigation strategies.
- This failure of ESPR 2017 to provide *accurate planning forecasts* **follows similar failings in ESPR 2011** which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

If the accuracy of these numerical forecasts are not true, there are *no elements or conclusions that can be relied upon*, which used these numbers. This should be self evident, but apparently it is not.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 63-1

Bill Trabilcy

70 Marlboro st

Belmont, MA

--
Says it all: https://t.co/KiJ9AZZsDR

https://getpocket.com/explore/item/your-smartphone-reduces-your-brainpower-even-if-it-s-just-sitting-there-1842351662

https://www.yahoo.com/news/even-fox-news-shoots-down-042603095.html

Lindsay Graham 2016: "Trump is a kook who is not fit to be president"
Lindsay Graham 2018: "the media's portrayal of Trump is 'an endless, endless attempt to label the guy as some kind of kook not fit to be president."

Trump's countless scams are finally catching up to him
http://flip.it/Xl2m6a

The First Family of Fraud   http://flip.it/_rxU6x

President Trump is a committed liar, as even his most dependable supporters openly concede.
http://flip.it/B5nb2p

How Donald Trump's amoral approach to the presidency is changing everything
http://flip.it/i_4hmu

Blatant lies, daily:
https://www.washingtonpost.com/politics/2018/11/02/president-trump-has-made-false-or-misleading-claims-over-days/
The Swamp:
Flynn- Guilty as charged
Pruitt- resigned due to ethics issues
Stone- Scum,,,early morning raid arrest by FBI!
Price
Ross
Lewandowski
Papadopoulus- Guilty as charged
Cohen- Guilty as charged
Manafort- Guilty as charged
Gates- Guilty as charged
Kushner- "routinely filed false documents with the city, claiming it had no rent-regulated tenants in its buildings
when, in fact, it had hundreds."

From: Andrea van Wien
To: Canaday, Anne (EEA)
Subject: "Boston Logan International Airport 2017 Environmental Status and Planning Report (EEA #3247)"
Date: Saturday, November 16, 2019 10:29:13 AM

PROJECT NAME/NUMBER: Boston Logan International Airport 2017 Environmental Status and Planning Report
(EEA #3247)

Dear Ms. Canaday:
Hundreds of thousands of Boston area residents are adversely affected by Federal Aviation Administration (FAA) and Massachusetts Port Authority (Massport) NextGen RNAV flights. As the founder of Logan Aircraft Noise Working Group, I appreciate this opportunity to comment on Massport's 2017 Environmental Status and Planning Report (ESPR) for Boston Logan International Airport.
Instead of responding to every detail of this Report, most of our members will focus on something we know only too well: the devastating impact of Massport's flight policies on the lives of our families and friends.
FAA AND MASSPORT'S DEEPLY CYNICAL STRATEGY
Massport's ESPR paints a rosy picture of Logan Airport's contribution to "strong national and regional economies" without adequately acknowledging and addressing the effects of its operations on communities beneath and adjacent to RNAV flight paths. Before these policies were rolled out on December 15, 2011, Boston area residents never could have imagined how their lives would be disrupted.

2
Touted as a means of promoting "efficiency" and "safety," this deeply cynical strategy concentrates flights into a few narrow, low-altitude corridors to geographically isolate noise and increase carrier capacity without raising the concerns of most citizens. Because virtually all jet airline traffic is dumped onto a minority of "sacrificial neighborhoods," an already intolerable situation has deteriorated into a crisis.
This scheme—enabled by passage of the flawed Airport Noise and Capacity Act of 1990—also allows FAA, Massport, and airlines to expand operations by scheduling flights from 10 pm through 7 am. Moreover, in a deliberate misapplication of the National Environmental Policy Act (NEPA), FAA's standards for environmental assessment were shrewdly calculated to return findings of "no significant impact."

Yet growing epidemiological evidence suggests a causal relationship between low-altitude aviation traffic and impaired cognitive development in children as well as

cardiovascular disease in adults.
It is telling that Massport placed the first waypoint for jets departing from Runway 33L above a complex of three public schools located seven miles from Logan Airport in Medford. Hundreds of low-altitude flights pass over students on this campus, disrupting classrooms and quiet study areas. Many of these planes then head past the multi-story Medford Senior Center and Tufts University before targeting lower and upper schools, colleges, and affordable-housing developments in Arlington, Belmont, Cambridge, Malden, Melrose, Milton,

Newton, Somerville, Watertown, and Winchester. Logan Aircraft Noise Working Group does not believe it is morally defensible to expose a relatively small segment of citizens—especially children, elders, and other vulnerable groups—to all jet traffic departing from a single Logan Airport runway.
Residents who cannot hear planes over their homes are unwitting victims of the same particulate emissions as those whose neighborhoods are audibly bombarded by aircraft. Millions of hearts and lungs are gradually being damaged by this invisible pollution. But, because many citizens do not understand the health impacts of this exposure, they fail to file complaints with Massport. The aviation industry then uses their "silence" to justify RNAV's inequitably dispersed flights. Whether FAA and Massport admit it or not, everyone will eventually pay for this scourge on our communities through increased health costs and decreased property values.

3
In its next Environmental Data Report, Massport is required by law to respond to every issue raised in public comments. Members of Logan Aircraft Noise Working Group will be taking advantage of this rare opportunity to share their unique perspective as victims of FAA's and Massport's profit-centered policies.
EXPECTED EFFECTS OF GLOBAL WARMING ON MASSPORT OPERATIONS
In 2018, the National Oceanic and Atmospheric Administration predicted that global warming will submerge critical transportation infrastructure in coastal areas of the United States within a few decades. See U.S. Global Change Research Program's Fourth National Climate Assessment, vol II (2018), produced by more than 300 experts from federal, state, and local governments; national laboratories, universities, and the private sector; with input from external stakeholders. This report (https://nca2018.globalchange.gov) focuses on the human welfare, societal, and environmental elements of climate change ... with particular attention paid to observed and projected risks, impacts, consideration of risk reduction, and implications under different mitigation pathways.
According to documented research in the study:
Throughout this century, climate change will continue to pose a risk to U.S. transportation infrastructure, with regional differences. ... Sea level rise (SLR) is progressively making coastal roads and bridges more vulnerable and less reliable. ... Higher sea levels will cause more severe flooding and more damage during coastal storms and hurricanes. Recent modeling shows how 1 foot of SLR combined with storm surge can result in more than 1 foot of increased storm surge. ...
SLR and storm surge also threaten coastal airports ... [A] rise of as much as 8 feet by 2100 is scientifically plausible due to possible Antarctic Ice Sheet instabilities. Coastal infrastructure will be exposed to the effects of relative SLR, which includes vertical land motion in addition to regional variations in the distribution of the global SLR. For example, relative SLR will be higher than the global average on the East and Gulf Coasts of the United States because of the sum of these effects.
... Transportation systems that are most vulnerable to the recent observed and projected increases in precipitation intensity are those where drainage is already at capacity, where projected heavy rainfall events will occur over prolonged

4
periods, and where changing winter precipitation increases transportation hazards from landslides and washouts.
See https://scenarios.globalchange.gov/sea-level-rise for scenarios illustrating a range of "plausible ... changes" in "local sea level rise along the entire U.S. coastline."
Given the inevitability of this future, it's time for Massport to abandon its efforts to increase capacity at Logan Airport and focus on moving its operations far from the coast and residents of a major metropolitan area. 64-1
MASSPORT'S ETHICAL RESPONSIBILITY TO BOSTON AREA RESIDENTS
Instead of doubling down on its morally bankrupt RNAV policies, Massport has an ethical responsibility to:
Disperse flights equitably by creating paths over all or most Boston area neighborhoods, not just a few narrow corridors, and make that policy the central focus of Professor John Hansman's MIT Noise Study recommendations;
Mandate higher altitudes over residential areas at all times;
Eliminate noise over residential areas between 10 pm and 7 am by requiring over-water flight approaches and departures;
Move waypoints away from schools, homes, elder residences, and affordable-housing developments—working closely with representatives on the Massport Community Advisory Committee, city officials, and advocate groups to choose more suitable locations; 64-1
Eliminate NEPA loopholes enabling environmental assessments to falsely find "no significant impact" from RNAV flight paths;
Work with the Joint Commission on Public Health and public health departments to investigate the health impacts of RNAV-related noise and particulate pollution; and
Require significant changes in the Massport noise-complaint system to eliminate its burdens and bias.

Thank you for providing this means for our group to share its perspective on FAA and Massport's NextGen RNAV policies. We look forward to helping Massport develop socially responsible procedures that enhance rather than disrupt the lives of residents in the Boston area.

Resident of Medford, MA
Andrea van Wien
25 Curtis Street, Medford, MA

From: Andrea van Wien
To: Canaday, Anne (EEA)
Subject: "Boston Logan International Airport 2017 Environmental Status and Planning Report (EEA #3247)"
Date: Saturday, November 16, 2019 10:23:53 AM

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan Intl Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. 64-2

Best,
Andrea van Wien
Resident of Medford, MA 02155

AC

RECEIVED
NOV 22 2019
MEPA

36 Dudley St.

Medford, Ma. 02155

11/13/2019

Secretary of Energy and Environmental Affairs

Executive Office of Energy and Environmental Affairs

Attn: MEPA Office

Anne Canaday, EEA #3247

100 Cambridge St., Suite 900

Boston, Ma. 02114

Project Name/Number: Boston Logan International Airport 2017
Environmental Status and Planning Report
(EEA #3247)

Dear Ms. Canaday,

Regionally, many thousands of Boston area residents have been adversely impacted by the NextGen RNAV changes implemented on a national level at or around June 2013, by the Federal Aviation Administration (FAA) and Massachusetts Port Authority (Massport). These changes have had a devastating impact on those who live beneath the narrowed flyways.

Since those flight path changes by Massport and the FAA, area residents (particularly Medford) can be pounded by airplane noise departures particularly from runway 33L, from 5-6 am until 1-2 am, sometimes for days on end. This change in the way planes are managed at Logan has impacted our quality of life and our very health! This flight pattern although quoted from Massport as only occurring from October to April due to wind direction, can basically occur from October to October. We are suffering and we need relief!

This is not just a concern for those residents directly under the flight paths, but should also be a concern for parents of school age children, since the waypoint for flights is over the McGlynn and Andrews schools and those recreational fields. Think about not just the noise pollution impact on learning in our classrooms but all those particulates raining down upon our children.

I have lived in Medford for over 35 years and when we first moved here, the noise from air traffic was minimal. The air traffic and the plane noise has increased exponentially over the past 6 years. There are days when many of us can expect 200-300 plus planes over our neighborhoods, some planes flying over

us at 1-2minute intervals. This results in severe sleep disruption, inability to converse with our neighbors and even to relax in our own homes, on our porches or in our yards.

We demand that Massport and the FAA remedy this situation by the following: 65-1

1. Disperse flights equitably to create paths over all or most of Boston suburban area neighborhoods, not just a few narrow flight path corridors, and make that policy the central focus of Professor John Hansman's MIT Noise Study recommendations;
2. Mandate higher altitudes over residential areas at all times;
3. Eliminate plane noise over residential areas between 10PM to 7AM (quiet hours) by requiring over water flight approaches and departures;
4. Move waypoints away from schools, homes, elder residences, and affordable housing developments, working closely with representatives of the Massport Community Advisory Committee, city officials and advocate groups to choose more suitable locations for same;
5. Eliminate NEPA loopholes enabling environmental assessments to falsely find "no significant impact" from RNAV flight paths;
6. Work with the Joint Commission on Public Health and public health departments to investigate the health impacts of RNAV related noise and particulate air pollution;
7. Require significant changes in the Massport noise complaint system to eliminate its burden and bias. (for example, eliminate "canned", condescending written responses from Massport)

Thank you for the opportunity to register my concerns regarding the FAA and Massport's NextGen RNAV policies. We hope that we can work with your agency and Massport to formulate socially responsible procedures that address the concerns of residents in the Boston area who live under Logan Airport flight paths.

Sincerely,

Maureen C. Wing

Maureen C. Wing

Alan Wright
98 Birch St., Roslindale, MA 02131
alnwright@gmail.com – C: 617-821-3648

November 18, 2019

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA# 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114

Sent by electronic mail to anne.canaday@mass.gov

Dear Secretary Theoharides:

I am submitting comments in response to the Boston Logan International Airport 2017 Environmental Status & Planning Report (ESPR). Please accept this letter as my submission.

I am a 32-year resident of and home owner in the City of Boston. Since 2000, I have represented my neighborhood of Roslindale and the adjacent neighborhoods of Jamaica Plain and West Roxbury to first, the Logan Community Advisory Committee, and now, to the successor organization, the state entity, the Massport Community Advisory Committee (MCAC) (see www.massportcac.org). I am known locally as an expert on the impact of Logan Airport operations on the quality of life for Boston residents who live under the Logan Runway 27 flight path. In that capacity I answer questions about the Logan operation and impact, help to organize meetings and activities regarding these impacts, and communicate to and coordinate with local governmental offices and elected officials. In addition, I am active in environmental and transportation advocacy organizations.

Comment

The Massachusetts Port Authority (Massport) has failed to adequately understand and address the grave environmental threat that Logan Airport aircraft operations pose to the residents of greater Boston, Massachusetts, and all of humanity. Air travel is the most intensive carbon dioxide (CO_2) producing form of travel possible. The recent failure of the nations of the world to meet national and global carbon reduction goals is partly the result of increases in air travel. Air travel is not a sustainable form of transportation given the impact it creates through climate change with the resulting sea level rise, increase in extreme weather events, and climate heating. Climate change will negatively affect all Massport facilities as well as Massachusetts residents. In addition, air travel produces environmentally disruptive and dangerous effects on the people who live under aircraft departure and arrival flight paths.

The 2017 Logan ESPR states that Massport "has a comprehensive strategy to ensure

that Logan grows in a sustainable and environmentally friendly way" and provides evidence of environmental mitigation strategies at all the Massport air traffic facilities but then proceeds to discuss plans for continued growth at Logan. This is a contradiction: It is not possible to continue to grow the airport and have sustainable and environmentally friendly effects from that growth.

Under the leadership of the new Massport CEO, Lisa Wieland, with the direction of the Massport Board of Directors, Massport must do more to address man-made climate change. Massport, as 66-1
the state entity responsible for Logan, Hanscom Field, and Worcester Airports, and the Massport ship and cargo facility, has exceptional opportunities to accomplish this because these facilities serve as the entryway to all of New England for travel and commerce. That is to say, Massport oversees one of the nation's great intersections between transportation and climate change and, accordingly, has a unique opportunity to reduce the carbon footprint of New England residents, not increase it as Massport growth plans describe.

Since 2009, Logan Airport has grown 23% and is expected to grow 17% by 2024. This increase is unsustainable, above and beyond the affect that it will have on the world's climate. The communities under the flight paths into and out of Logan Airport, with the projected growth in air traffic, will be forced to endure the extension of life-disrupting noise into the early morning and late evening hours — the times when many of the additional flights will have to be scheduled, given the limited runway capacity at the airport. More flights will also lead to an increase in the amount of particulate matter and exhaust that rains down on these communities. Ample evidence already exists linking the particulate matter and exhaust to respiratory problems and other forms of illness.

The facilities that Massport manages are themselves threatened by climate change; as the atmosphere grows warmer, sea levels rise, and storms become more violent. But above all, the ongoing increase in CO2 that human activity – particularly air travel - is adding to the atmosphere is not sustainable. Climate change is not only real, but is happening faster than almost anyone predicted. In spite of the uncertainties in current climate science, we know more than enough to know that we must act now to reduce CO2 emissions.

All of us who travel by air must acknowledge our responsibility for climate change and be willing to share in the expense of creating more sustainable forms of transportation. Accordingly, 66-1
Massport should stop adding new terminal and runway capacity at all of its air facilities and stop recruiting an increase in travelers with its airline partners. And, Massport, in partnership with state and federal elected officials and transportation organizations, should explore ways to reduce 66-2
incentives for the public to fly and actively work to enhance other less polluting means of transportation. For example, Massport, through the state federal officials, could seek a revision in the Federal Aviation Administration authorizing legislation to add a carbon fee to the landing fees that are charged of airlines for use of Massport airports. Fees placed on the consumption of goods with negative social consequences are very effective at assisting consumers to self-regulate away from their use.

Such a fee could be dedicated to providing transportation alternatives for everyone. The income generated by a fee could be used to enhance rail travel within New England and beyond. It could

fund building a long-overdue north-south rail connection under downtown Boston or support additional passenger rail development to other parts of the state.

I call upon Ms. Wieland and the Massport Board of Directors to bring Massport into the 21st Century existential fight to preserve the climate that has made civilization possible. She should enlist the Massachusetts Congressional delegation to work to revise the FAA regulations that currently prevent Massachusetts citizens – who own the Massport facilities – from using our resources to protect our environment. 66-1

Ms. Wieland, a Harvard Business School Graduate with five years of experience as a Massport employee, is well-qualified to provide the leadership on this issue that we need. And she can be sure that she will enjoy the support of the people of Massachusetts, who so often in the past have led the nation — in education, health care, technology, and social justice. It's part of who we are; indeed, there is a growing hunger among us to show that we can lead again by quickly and effectively responding to the urgent climate crisis that is hurtling upon us.

The next Massport ESPR should be based on a radical revision of goals for the Massport facilities – goals that reflect the true external costs of fossil fueled based transportation. 66-2

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Responses to Comment Letters

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Comment #	Author	Topic	Comment	Response
1-1	Walter Timilty, State Senator	Flight Paths, Forecasts, Air Quality/Emissions, Noise	It is imperative that critical consideration be made to the health impacts of the increased flights over Milton and its' surrounding communities.	Massport continues to present information on research findings on public health, including noise and air emissions. Refer to Chapters 6, *Noise Abatement* and 7, *Air Quality/Emissions Reduction* for summaries and more details related to airport noise and air quality impacts on public health. Massport will continue to advance strategies for reducing overall Logan Airport-related impacts..
1-2	Walter Timilty, State Senator	Reporting	I am, respectfully, requesting that the Massachusetts Environmental Policy Act strongly embrace the Town of Milton's concerns with Boston Logan International Airport 2017 Environmental Status and Planning Report.	A key goal of the Environmental Data Reports (EDRs)/(Environmental Status and Planning Reports (ESPRs) is to annually provide data and analysis to local communities including the Town of Milton on Logan Airport activity and environmental impacts.
2-1	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	Forecasts	ESPR 2017 must be updated to reflect a more accurate projection of growth in operations, along with a corresponding plan to provide adequate mitigation in surrounding areas for the associated impacts.	Massport is required to prepare periodic forecast updates for each ESPR. These updated forecasts allow for the review of local, national, and international aviation and economic trends in an effort to provide the most relevant data at the time of document filing. With all forecasts, these are based on best available information and subject to change. As is evidenced by the ongoing COVID-19 pandemic, any forecast can be altered drastically and without warning in ways that can cause rapid increases or decreases in aircraft operations and passenger activity levels. At the time of this filing, Logan Airport was operating at levels not seen since the 1970s. As a result, there are far fewer aircraft operations and passengers and a dramatic drop in overall Logan Airport activity. While activity levels began a slow rebound in mid-summer 2020, national and international aviation activity forecasts suggest a several year recovery to regain pre-COVID-19 conditions. As the longer-range impact of the pandemic become clearer, Massport expects to be able to present updated forecasts pertaining to the anticipated recovery. The *2020 EDR* will present the best information at that time. As Massport begins to better understand future passenger activity and aircraft operations trends, forthcoming EDRs/ESPRs will outline the continuing and evolving strategies to minimize operational and environmental impacts of Logan Airport operations.
2-2	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	Forecasts	Massport's projected growth rates are out of sync with both their own Future Planning Horizon forecast as well as the Federal Aviation Administration's Terminal Area Forecast estimates. There is currently no credible evidence that Logan Airport growth will suddenly slow within the next several years, in light of historic data, regional trends, or current plans for expansion by airlines and Massport alike.	Demand for air travel at Logan Airport is driven by macro, socioeconomic conditions and demographics. Logan Airport as a transportation facility does not drive demand but accommodates the demand that is generated locally and regionally. The Boston region is a diverse, dynamic, world class economy including high tech/biotech, health care, higher education, finance, a desirable tourist destination, and has generally wealthy residents that travel. For this reason Massport has a broad strategy to increase high-occupancy vehicle (HOV) modes/reduce single occupancy vehicles, increase the use of regional airports, and implement environmental initiatives detailed in the EDRs/ESPRs. Massport invested over $100M in Worcester Regional Airport including a new Category III (CAT III) Instrument Landing System (ILS) to improve operational conditions and enhance safety to a level equal to that of all other commercial airports in New England. The CAT III ILS improves Worcester's all-weather reliability. This has resulted in attracting regularly scheduled, commercial service. Hanscom Field continues to be New England's second busiest airport with ongoing investments expanding corporate jet service.
2-3	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	Regional Transportation	The ESPR would also be enhanced by further discussion and analysis of the impacts of high-speed rail and water transportation projects, as well as airport regionalization strategies and the potential effects of airport ground access fees.	Chapter 4, *Regional Transportation* presents details on the New England regional airports and their activities, and track ridership on Amtrak which recently has carried more passengers between Boston and New York than aircraft.

Comment #	Author	Topic	Comment	Response
2-4	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	Regional Transportation, HOV	Massport should examine how they can contribute to the realization of these regional improvements in conjunction with MassDOT, the MBTA, and other relevant stakeholders.	As outlined in Chapter 5, *Ground Access to and from Logan Airport,* Massport has an aggressive ground access program to reduce single occupancy vehicles and increase HOV modes. The most recent initiatives have complemented regional transportation improvements including expanded Logan Express service, new point to point bus service like the Back Bay Logan Express, pricing/infrastructure/policy changes to reduce congestion, and increased efficiency of RideApp services. The public's interest in using HOV transportation services like buses, rapid transit, and commuter rail, has also been significantly affected by concerns about COVID-19. Within that context, Massport continues to evaluate and plan for the recovery of air passenger activity and remains committed to implementing a broad range of ground access strategies.
2-5	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	HOV, Traffic	Massport should continue to monitor and make improvements to this system to ensure that TNC ridership operates with the greatest possible efficiency and minimal impacts.	In 2018, Massport relocated the RideApp pool from the Red Lot to the taxi pool location on Porter Street and moved the taxi pool to the Blue Lot (next to the Logan Office Center). In 2019, Massport relocated the gas station from Terminal E to the Red Lot, making it closer to the Rental Car Center and the limousine, taxi, and RideApp pools. Each of these relocations generally improved on-Airport routing by shortening the distances between key, active nodes. Details of the 2018 and 2019 vehicle miles traveled (VMT) modeling results are presented in Appendix G, *Ground Access to and from Logan Airport*. At the end of 2019, Massport consolidated the RideApp drop-off/pick-up location into the ground floor of the Central Parking facility. This significantly improved the efficiency of RideApp operations. We continue to evaluate RideApp activity and work with the companies and drivers to improve efficiency and minimize impacts while providing a high quality experience for our customers. We will continue to look at opportunities to shift drop-off/pick-up activity to HOV modes and acknowledge the local and regional benefits of doing so.
2-6	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	HOV, Traffic	Improvements to Logan Express service offer the greatest potential to reduce traffic impacts associated with Logan Airport.	Massport continues evaluating RideApp activity and working with the companies and drivers to improve efficiency and minimize impacts while providing a high quality experience for our customers. Massport will also continue looking at opportunities to shift drop-off/pick-up activity to HOV modes, such as Logan Express, and acknowledges the local and regional benefits of doing so.
2-7	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	HOV, Traffic	Massport should seriously consider implementation of these various [Logan Express] measures in order to address ongoing issues.	The COVID-19 pandemic has had a major impact on Massport operations due to a dramatic reduction in daily flight operations and an approximately 90-percent reduction in passenger levels in spring 2020. An even more dramatic decline in ridership was experienced on the Logan Express buses during the early months of the pandemic. As such, the schedule for implementing the Logan Express action plan (detailed in Chapter 5, *Ground Access to and from Logan Airport*) has been adjusted. As a point of reference, Logan Express ridership is 88 percent lower in August 2020 compared to the same month the previous year. Within that context, Massport continues to evaluate and plan for the recovery of air passenger activity and remains committed to implementing a broad range of ground access and trip reduction strategies. Massport expects passenger activity to recover to pre-pandemic levels over time.

Comment #	Author	Topic	Comment	Response
2-8	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	Forecasts, Noise, Air Quality/Emissions	Massport should take responsibility for increasing noise abatement and pollution control measures to a magnitude at least equal to that of current and planned expansions. Updating the Preferential Runway Advisory System (PRAS) is essential to regional noise mitigation, and would be an effective component of this document's evaluation.	Current Logan Airport noise abatement procedures include higher shoreline crossings, noise abatement turns, and late night runway preferences to reduce flights over densely populated areas and increase over the water flights when possible. The Area Navigation (RNAV) Study is based on a Memorandum of Understanding (MOU) between the Federal Aviation Administration (FAA) and Massport committing both organizations to look for opportunities to reduce impacts stemming from FAA's NextGen modernization for the air space system. This is a unique, innovative program with technical work being performed by the Massachusetts Institute of Technology (MIT) as independent experts. The study began in 2017 and continues with ideas to increase over-water procedures and reducing flight concentration. Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Boston communities, on a regular basis and continues to work on looking for measures to reduce overflight noise. As part of the Boston Logan Airport Noise Study (BLANS), the Logan Airport Community Advisory Committee chose not to pursue a new PRAS and could not come to agreement given the difficult discussion related to sharing of overflight noise. Massport will collaborate with the MCAC (legislated advisory committee to Massport and superseded the Logan Airport CAC) if it chooses to undertake a new PRAS effort.
2-9	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	Flight Paths	Additionally, decreasing the impact of nighttime flights by diverting activity to overwater air traffic corridors should be vigorously pursued.	Massport has an extensive noise and air emissions mitigation program that benefits all communities, especially nearby communities including East Boston, Chelsea, Revere, South Boston, and Winthrop. This program includes time/location limits on engine run-ups, late night runway use preference, single engine taxiing, gate plug-in technology, runway use limitations, sound insulation for eligible residents, aircraft towing requirements, and noise abatement turns. Noise abatement procedures include late night preference for over-water operations. Additionally, there is an ongoing study by FAA which proposes a new design for overwater procedures to take advantage of RNAV.
2-10	Adrian C. Madaro, Representative 1st Suffolk District,	Flight Paths	Massport should also explore all legal and logistical pathways to imposing increased landing fees on nighttime flights.	Landing fees and how they are set are based on federal regulation which prohibit discriminating against users. For these reasons, Massport efforts have been focused on mitigation of noise (and air) impacts when possible and as detailed in the EDRs/ESPRs.
2-11	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	Noise	Schools within the 60 DNL contour, and within the 65 DNL contour in particular, should receive increased soundproofing assistance in order to protect from the exceptional amount of excess noise pollution caused by aircraft operations.	As described in Chapter 6, *Noise Abatement* Massport has implemented sound insulation measures for schools within the broader noise contour defined by the school day/school year. To date, Massport has provided sound insulation for a total of 36 schools nearby Logan Airport.
2-12	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	Noise	It is critical that the widespread effects of noise pollution are thoroughly mitigated as noise contours continue to adjust and, in places like East Boston, intensify in densely populated areas.	Massport's noise abatement program has been in place since the 1980s. As described in Chapter 6, *Noise Abatement,* current noise contours are within all areas that have already been sound insulated. Massport will continue to publish regular contours to ensure eligibility overtime, however, given the extensive sound insulation efforts to date and the reduced noise contour, future eligibility in East Boston will be limited to homes that meet FAA criteria. To date, Massport has provided sound insulation for a total of 36 schools and 11,515 residential units around Boston Logan Airport.

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2-13	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	Air Quality/Emissions	It is of vital importance that Massport take steps to mitigate these harmful emissions directly and effectively.	Massport is a national leader in studying, tracking, and reporting on the air quality environment of Logan Airport, and in implementing measures to reduce emissions. Recognized as early as 2008 with an environmental award for Logan Airport's Emissions Reduction Program, Massport annually prepares an inventory of Airport-related emissions of the U.S. Environmental Protection Agency (EPA) criteria air pollutants (and their precursors) including CO, NO_X, PM_{10}/$PM_{2.5}$, VOCs, and GHGs. As part of implementing and advancing its ongoing air quality management strategy for Logan Airport, Massport has established a number of goals and objectives to address air emissions from Airport operations, including emissions reduction through ground service equipment (GSE) and Massport vehicle fleet. Efforts include an alternative fuel program, reducing emissions from stationary sources, working with airlines to reduce aircraft emissions and with FAA to study and implement airfield-improvement concepts and operational changes that may have air quality benefits.
2-14	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	Forecast, Air Quality/Emissions	Moreover, the level of mitigation should account for not only the significant gap between Massport's previous estimates and current reality, but also the likely emissions resulting from a more accurate, realistic projection of future growth.	The next ESPR will include forecasted demand levels which are then modeled to estimate future noise and emissions trends. This effort also provides context for discussions related to a noise exposure map for sound insulation with FAA as well as for any specific project's environmental review.
2-15	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	Forecast, Noise, Air Quality/Emissions, Flight Paths	These existing impacts should be fully documented, analyzed and mitigated under the environmental review process currently underway. Massport has a responsibility to address and fully account for the full range of impacts resulting from airport growth.	For over three decades, the EDRs/ESPRs document and report on existing conditions associated with airport activities. Massport is the only airport in the country that provides this annual update on ground access, noise, air quality, water quality, and sustainability efforts. Project-specific impacts subject to the National Environmental Policy Act (NEPA) and/or the Massachusetts Environmental Policy Act (MEPA) are assessed individually, using the EDRs and ESPRs as context.
2-16	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	Forecast	I respectfully request that the Executive Office of Energy and Environmental Affairs require Massport to provide a revised description and analysis of the potential increases in passenger and aircraft operational levels in a Supplemental High Growth Scenario which incorporates more accurate growth rates over the next five years for passenger and aircraft activity levels, in line with recent trends at Logan Airport.	As part of the EDR/ESPR process, Massport is required to prepare periodic forecast updates for each report. These updated forecasts allow for the review of local, national and international aviation and economic trends in an effort to provide the most relevant data at the time of document filing. As with all forecasts, these are based on best available information and subject to change. Future ESPRs build on those prior experiences and the latest industry information to update expectations on growth and impacts on passenger and flight demand.
2-17	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	Forecast, Noise, Air Quality/Emissions, Traffic	These forecasts should be accompanied by Revised Impact Projections, which similarly describe and analyze future noise, emissions, and traffic burdens in a more realistic manner.	The ESPR includes forecasted demand levels which are then modeled to estimate future noise and emissions trends. While passenger levels reached a new milestone in 2019, in March 2020, flights in and out of Logan Airport were dramatically reduced and passenger levels dropped by over 90 percent at the peak of the pandemic in the spring and summer of 2020. While recovery is expected, the timeline for a return to recent levels is not yet known. The *2020 EDR* will provide the best available information. As always, the EDRs and ESPRs will provide regular updates on operational and environmental impacts and Massport's strategies to minimize those community impacts.

Comment #	Author	Topic	Comment	Response
2-18	Adrian C. Madaro, Representative 1st Suffolk District, Boston, MA	Environmental Justice, Mitigation	Massport should subsequently adjust mitigation implementation commitments to proactively address the future environmental implication of these scenarios to accurately alleviate conditions in already burdened environmental justice communities.	Massport has in place an extensive noise and air emissions mitigation program that benefits all communities but especially nearby communities including East Boston, Chelsea, Revere, South Boston, and Winthrop. These communities include Environmental Justice (EJ) areas. Mitigation measures includes time/location limits on engine runups, late night runway use preference, single engine taxiing, gate plug-in technology, runway use limitations, soundproofing to eligible residents, aircraft towing requirements, and noise abatement turns. Massport continues to work with FAA, research institutions like MIT and the MCAC to look for ways to reduce impacts and expand research including on ultrafine particles (UFP). Massport is also working with the East Boston Health Center to target health measures for vulnerable populations. The EDRs/ESPRs process includes community outreach and provides translation options for Spanish. The EDRs/ESPRs provide cumulative snapshots of Logan Airport's environmental impacts and inform the public on efforts to reduce those impacts. Mitigation efforts are related to project-specific mitigation which are the result of separate environmental processes that include extensive public outreach and input. Refer to Chapter 9, *Environmentally Beneficial Measures and Project Tracking Mitigation* , for more details.
3-1	DOER, Paul Ormond, P.E.- Energy Efficiency Engineer	Air Quality/Emissions	Moving forward, we recommend that future planning reports incorporate and consider the following: • Massachusetts' changing electric grid emissions; and • Opportunities for distributed renewable generation Massachusetts facilities such as Logan that use combined heat and power (CHP) to heat, cool, and power buildings, the emission picture is more complex. In order to fully analyze buildings' GHG emissions, we recommend the following: • Space and water heating end use consumption should be estimated and broken down by heating which is provided by central plant steam versus heating provided by fossil-fuel fired (or other) equipment; • Similarly, space cooling end use consumption should be estimated and broken down by cooling from central plant produced chilled water versus cooling provided by other non-CHP means; • CHP heating and cooling production efficiency and power production efficiency should be estimated. Once the above is estimated, building space heating, space cooling, and service water heating emissions can then be estimated. This analysis should be done using electric grid emissions of 700 lbs./MWhr, representative of today's emissions and 200 lbs./MWhr, representative of future emissions. Future reports could also explore the potential to host distributed renewables, such as rooftop PV, throughout the airport. For example, Logan's parking garages are relatively large and generally have unobstructed exposure which can offer significant potential opportunity to host solar PV. In summary, our recommendation for future planning reports is to consider changing grid emissions and seek opportunities to host renewable generation.	Massport utilizes current grid emissions factors and as they are updated and incorporates those into emissions reporting as necessary. Periodic updates to the emissions factors are incorporated into emissions calculations included in the EDRs/ESPRs. Massport currently produces over one million kilowatt hours of renewable energy from solar arrays at various locations across Massport properties. Additional comments on distributed renewable power generation are noted. The calculation of emissions to the building systems level are not currently done or planned for this report. Massport does and will continue to evaluate opportunities for distributed renewable energy production on a project-by-project basis.

Comment #	Author	Topic	Comment	Response
4-1	RoseLee Vincent, State Representative, 16th District	Forecast, Impacts	ESPR 2017 must be updated to reflect a more accurate projection of growth in operations, along with a corresponding plan to provide adequate mitigation in surrounding areas for the associated impacts.	The EDR/ESPRs provide cumulative snapshot of Logan Airport's environmental impacts and inform the public on efforts to reduce those impacts. The *2018/2019 EDR* provides updated statistics on Logan Airport's operations and demand and includes trends on industry developments. This includes updates since the COVID-19 pandemic and the substantial impact on the aviation industry. Mitigation efforts are related to project-specific mitigation which are the result of separate environmental processes that include extensive public outreach and input. Refer to Chapter 9, *Environmentally Beneficial Measures and Project Tracking Mitigation*, for more details.
4-2	RoseLee Vincent, State Representative, 16th District	Forecasts	As we pursue solutions to these congestion issues, it is essential that we have accurate estimates of Logan Airport growth so that these increases can be accounted for in planning the future of our transportation system.	As part of the EDR/ESPR process, Massport is required to prepare periodic forecast updates. These updated forecasts allow for the review of local, national, and international aviation and economic trends in an effort to provide the most relevant data at the time of document filing. The ESPR includes forecasted demand levels which are then modeled to estimate future noise and emissions trends. While passenger levels reached a new milestone in 2019, in March 2020, flights in and out of Logan Airport were dramatically reduced and passenger levels dropped by over 90 percent at the peak of the COVID-19 pandemic in the spring and summer of 2020. While recovery is expected, the timeline for a return to recent levels is not yet known. The *2020 EDR* will provide the best available information. As always, the EDRs and ESPRs will provide regular updates on operational and environmental impacts and Massport's strategies to minimize those community impacts.
4-3	RoseLee Vincent, State Representative, 16th District	Transit	A number of long-term transit infrastructure improvements would be beneficial to decreasing the traffic footprint caused by Logan Airport, and its subsequent burdens both on Logan's passengers and the region as a whole. Investments to the Blue Line, including signal upgrades and the construction of the Red Line-Blue Line connector, would allow for increased capacity and frequency going toward downtown, as well as providing a direct connection to important economic corridors along the Red Line. Construction of a Silver Line Underpass at D Street would allow the Silver Line to operate more efficiently and bypass some of the traffic issues it currently faces.	Massport evaluated a potential connection between the MBTA Red Line and Blue Line in the Environmental Assessment (EA)/Environmental Impact Report (EIR) for the Terminal E Modernization Project. The assessment included an analysis of the existing capacity on the Blue Line. A review of ridership and trainset capacity on the Blue Line indicated that there is significant reserve capacity (passenger space available within the trainset) remaining on the Blue Line during the peak hour in the peak direction. Even with a doubling of Blue Line use by air passengers, there is still significant Blue Line capacity available. Massport will continue to work with MBTA on the status and the potential design of the pedestrian connector to the Blue Line at Airport Station and ways to improve Silver Line operations to the Airport.
4-4	RoseLee Vincent, State Representative, 16th District	Regional Transportation, Ground Access	The ESPR would also be enhanced by further discussion and analysis of the impacts of high-speed rail and water transportation projects, as well as airport regionalization strategies and the potential effects of airport ground access fees.	The ESPR analyzes and reports performance in HOV mode share, parking demand, and other ground access and air quality statistics under the existing EDR/ESPR process. Massport continues to look at ways to improve HOV access to the Airport, including working with various state agencies on regional transportation solutions to enhance HOV options. As part of the Massachusetts Department of Environmental Protection (MassDEP) approval of an amendment to the Logan Airport Parking Freeze for 5,000 additional on-airport spaces, Massport was required to conduct a number of ground access studies including measures to improve HOV access to Logan Airport. These studies were published in 2019 and can be found on the Massport website. The studies evaluated and addressed several regional access strategies including additional Logan Airport Express sites, water transportation projects, and pricing.

Comment #	Author	Topic	Comment	Response
4-5	RoseLee Vincent, State Representative, 16th District	Regional Transportation	Massport cannot continue to look only at on-campus solutions to transit issues exacerbated by Logan Operations, which have permeated well beyond the confines of their borders. Massport should examine how they can contribute to the realization of these regional improvements in conjunction with MassDOT, the MBTA, and other relevant stakeholders.	The ESPR analyzes and reports performance in HOV mode share, parking demand, and other ground access and air quality statistics under the existing EDR/ESPR process. Massport continues to look at ways to improve HOV access to the Airport, including working with various state agencies on regional transportation solutions to enhance HOV options to the Airport. As part of the MassDEP approval of an amendment to the Logan Airport Parking Freeze for 5,000 additional on-airport spaces, Massport was required to conduct a number of ground access studies including measures to improve HOV access to Logan Airport. These studies were published in 2019 and can be found on the Massport website. The studies evaluated and addressed several regional access strategies including additional Logan Airport Express sites, water transportation projects, and pricing.
4-6	RoseLee Vincent, State Representative, 16th District	Ground Access	The recent reconfiguration of pick-up and drop-off facilities for TNCs at Logan is a good first step toward making the rideshare system more efficient and reducing deadhead trips. Massport should continue to monitor and make improvements to this system to ensure that TNC ridership operates with the greatest possible efficiency and minimal impacts. Overall, however, the greatest improvements will be to get passengers out of TNCs and into high occupancy vehicles.	Massport continues to evaluate RideApp activity and work with the companies and drivers to improve efficiency and minimize impacts while providing a high quality experience for our customers. We will continue to look at opportunities to shift drop-off/pick-up activity to HOV modes and acknowledge the local and regional benefits of doing so. Chapter 5, *Ground Access to and from Logan Airport* presents this information, including 2020 updates, as available. Air traffic and passenger activity levels have been significantly affected by concerns related to the COVID-19 pandemic. Within that context, Massport continues to evaluate and plan for the recovery of air passenger activity and remains committed to implementing the broad range of ground access strategies that are outlined throughout the chapter. The schedule for those improvements will be adjusted according to the current conditions. In 2018, Massport relocated the RideApp Pool from the Red Lot to the taxi pool location on Porter Street and moved the Taxi Pool to the Blue Lot (next to the Logan Office Center). In 2019, Massport relocated the gas station from Terminal E to the Red Lot, making it closer to the Rental Car Center and the limousine, taxi, and RideApp pools. Each of these relocations generally improved on-Airport routing by shortening the distances between key, active nodes. Details of the 2018 and 2019 VMT modeling results are presented in Appendix G, *Ground Access to and from Logan Airport* .
4-7	RoseLee Vincent, State Representative, 16th District	Ground Access	By increasing the frequency, availability, and affordability of Logan Express, Massport can make the service more attractive to passengers, reducing customer reliability on private vehicles and TNCs use. Increased frequency and availability makes Logan Express more accessible an easier option to use, and increasing its visibility shows travelers its potential as a visibility and attractive transit option.	Massport continues to look at opportunities to improve HOV access to the Airport, including improvements to Logan Airport Express services. As part of the MassDEP approval of an amendment to the Logan Airport Parking Freeze for 5,000 additional on-airport spaces, Massport was required to conduct a number of ground access studies including measures to improve HOV access to Logan Airport. These studies were published in 2019 and can be found on the Massport website. The studies evaluated and addressed several regional access strategies including additional Logan Express sites and improvements to Logan Express service. Until early 2020 when the COVID-19 pandemic began to affect daily life, Massport was aggressively pursuing a series of Logan Express improvements including expansion of the Framingham Garage. Massport had also purchased new buses to start a planned new North Station urban location. Currently, many of those improvements have been put on hold due to the COVID-19 pandemic. We look forward to moving ahead with these improvements commensurate with the return of passenger levels.
4-8	RoseLee Vincent, State Representative, 16th District	Ground Access	Additionally, with more dedicated bus lanes, it would be seen as a faster alternative to traffic-burdened TNCs, especially for travelers who are concerned with making their flight on time.	Massport will continue to work with state and local agency partners to improve infrastructure that benefits airport access by HOV modes. Massport recognizes that these efforts are opportunities to improve travel time and reliability.

Comment #	Author	Topic	Comment	Response
4-9	RoseLee Vincent, State Representative, 16th District	Ground Access	Massport can also make Logan Express easier to use by developing shuttle terminus locations that provide more comprehensive services off-site, such as airline and rental car services, remote baggage check, low-cost on-site parking facilities, and prioritized curbside passenger pick-up and drop-off areas. Expanding the number of shuttle locations and providing increased services would decentralize operations and reduce vehicle traffic from the congested surroundings of Logan Airport. Massport should seriously consider implementation of these various measures in order to address ongoing issues.	Massport continues to look at opportunities to improve HOV access to the Airport, including improvements to Logan Express services. As part of the MassDEP approval of an amendment to the Logan Airport Parking Freeze for 5,000 additional on-airport spaces, Massport was required to conduct a number of ground access studies including measures to improve HOV access to Logan Airport. These studies were published in 2019 and can be found on the Massport website. The studies evaluated and addressed several regional access strategies including additional Logan Express sites and providing additional services such as remote baggage check. Until early 2020 when the COVID-19 pandemic began to affect daily life, Massport was aggressively pursuing a series of Logan Express improvements including expansion of the Framingham Garage. Massport had also purchased new buses to start a planned new North Station urban location. Currently, many of those improvements have been put on hold due to the COVID-19 pandemic. We look forward to moving ahead with these improvements commensurate with the return of passenger levels.
4-10	RoseLee Vincent, State Representative, 16th District	Noise	Massport should take responsibility for increasing noise abatement and pollution control measures to a magnitude at least equal to that of current and planned expansions. Updating the Preferential Runway Advisory System (PRAS) is essential to regional noise mitigation, and would be an effective component of this document's evaluation. Additionally, decreasing the impact of nighttime flights by diverting activity to overwater air traffic corridors should be vigorously pursued. Massport should also explore all legal and logistical pathways to imposing increased landing fees on nighttime flight operations landings. Schools within the 60 DNL contour, and within the 65 DNL contour in particular, should receive increased soundproofing assistance in order to protect from the exceptional amount of excess noise pollution caused by aircraft operations. It's critical that the widespread effects of noise pollution are thoroughly mitigated as noise contours continue to adjust and, in places like East Boston, intensify in densely populated areas.	Current Logan Airport noise abatement procedures include higher shoreline crossings, noise abatement turns, and late night runway preferences to reduce flights over densely populated areas and increase over the water flights when possible. The Area Navigation (RNAV) Study is based on a MOU between FAA and Massport committing both organizations to look for opportunities to reduce impacts stemming from FAA's NextGen modernization for the air space system. This is a unique, innovative program with technical work being performed by MIT as independent experts. The study began in 2017 and continues with ideas to increase over the water procedures and reducing flight concentration. Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Boston communities, on a regular basis and continues to work on looking for measures to reduce overflight noise. As part of the Boston Logan Airport Noise Study (BLANS), the Logan Airport Community Advisory Committee chose not to pursue a new PRAS and could not come to agreement given the difficult discussion related to sharing of overflight noise. Massport will collaborate with MCAC (legislated advisory committee to Massport and superseded the Logan Airport CAC) if it chooses to undertake a new PRAS effort.
4-11	RoseLee Vincent, State Representative, 16th District	Air Quality	It is of vital importance that Massport take steps to mitigate these harmful emissions directly and effectively. One significant way to mitigate such pollutants would be air filtrations projects for schools, community spaces, and residential homes in the most significantly impacted areas. Moreover, the level of mitigation should account for not only the significant gap between Massport's previous estimates and current reality, but also the likely emissions resulting from a more accurate, realistic, projection of future growth.	Massport has an extensive noise and air emissions mitigation program that benefits all communities, especially nearby communities including East Boston, Chelsea, Revere, South Boston, and Winthrop. This includes time/location limits on engine runups, late night runway use preference, single engine taxiing, gate plug-in technology, runway use limitations, soundproofing to eligible residents, aircraft towing requirements, noise abatement turns. Massport continues to work with FAA, research institutions like MIT and the MCAC to look for ways to reduce impacts and expand research including on UFP.
4-12	RoseLee Vincent, State Representative, 16th District	Airport Growth, Impacts	These existing impacts should be fully documented, analyzed, and mitigated under the environmental review process currently underway. Massport has a responsibility to address and fully account for the full range of impacts resulting from airport growth.	For over three decades, the annual EDRs/ESPRs document and report on existing conditions associated with airport activities. Massport is the only airport in the country that provides this annual update on ground access, noise, air quality, water quality, and sustainability efforts. Project specific impacts subject to NEPA and/or MEPA are assessed individually, using the EDRs/ESPRs as context. Mitigation for project-related impacts are provided where needed.
4-13	RoseLee Vincent, State Representative, 16th District	Airport Growth, Impacts	This level of airport growth and environmental degradation speaks to a need for an enhanced level of response and mitigation from that offered in ESPR 2017.	The EDRs/ESPRs provide cumulative snapshots of Logan Airport environmental impacts and inform the public on broad efforts to reduce impacts. Mitigation efforts are related to project-specific mitigation which are the result of separate environmental processes that include extensive public outreach and input.

Comment #	Author	Topic	Comment	Response
4-14	RoseLee Vincent, State Representative, 16th District	Forecasts	I respectfully request that the Executive Office of Energy and Environmental Affairs require Massport to provide a revised description and analysis of the potential increases in passenger and aircraft operational levels in a Supplemental High Growth Scenario which incorporates more accurate growth rates over the next five years for passenger and aircraft activity levels, in line with the recent trends at Logan International Airport.	As part of the EDR/ESPR process, Massport is required to prepare periodic forecast updates. These updated forecasts allow for the review of local, national and international aviation and economic trends in an effort to provide the most relevant data at the time of document filing. As with all forecasts, they are based on best available information and subject to change. Future ESPRs build on those prior experiences and the latest industry information.
5-1	Lydia Edwards, Boston City Council, District 1	Forecasts	It is imperative that the Commonwealth verify to the greatest extent possible the accuracy of current reporting and future projections and ensure mitigation by Massport is commensurate with the scale of the problem.	As part of the EDR/ESPR process, Massport is required to prepare periodic forecast updates. These updated forecasts allow for the review of local, national and international aviation and economic trends in an effort to provide the most relevant data at the time of document filing. As with all forecasts, they are based on best available information and subject to change. Future ESPRs build on those prior experiences and the latest industry information.
5-2	Lydia Edwards, Boston City Council, District 1	Community Engagement	With regards to non-aerial transportation by Massport, to and from Massport properties, and other transportation in East Boston, Massport can also take additional steps. If any revenue from Massport's airports are ineligible for these uses, Massport could direct revenues from land leases elsewhere in Boston to help implement these priorities.	Massport has a comprehensive, multi-pronged, trip reduction strategy to diversify and enhance ground transportation options for passengers and employees traveling to and from Logan Airport. The ground transportation strategy is designed to offer passengers traveling to and from Logan Airport with a choice of HOV, transit, and shared-ride options that are convenient and reliable, and that reduce environmental and community impacts. Logan Airport continues to be one of the top of U.S. airports in terms of HOV and transit mode share with access to and from the Airport. Massport promotes numerous HOV, transit, and shared-ride options to improve on Airport roadway and curbside operations, alleviate constraints on parking, and improve customer service. Refer to Chapter 5, *Ground Access to and from Logan Airport* for more information. Due to the grants provided by FAA, Massport does not have the ability to divert revenue to non-aviation uses.
5-3	Lydia Edwards, Boston City Council, District 1	Air Quality/Emissions, Noise	Massport can and should continue to expand efforts to provide express bus service to Logan Airport. Expanding advertising of express bus services and continuing to analyze commuting and traffic patterns to identify new locations for bus service is an important tool; and Massport can increase bus or shuttle services to other Massport facilities such as Worcester and research flight destinations of travelers hailing from regions between Boston and Central Massachusetts.	Massport continues to look at opportunities to improve HOV access to the Airport, including improvements to Logan Express services. As part of the MassDEP approval of an amendment to the Logan Airport Parking Freeze for 5,000 additional on-airport spaces, Massport was required to conduct a number of ground access studies including measures to improve HOV access to Logan Airport. These studies were published in 2019 and can be found on the Massport website. The studies evaluated and addressed several regional access strategies including additional Logan Express sites and improvements to Logan Express service. Until early 2020 when the COVID-19 pandemic began to affect daily life, Massport was aggressively pursuing a series of Logan Express improvements including expansion of the Framingham Garage. Massport had also purchased new buses to start a planned new North Station urban location. Currently, many of those improvements have been put on hold due to the COVID-19 pandemic. We look forward to moving ahead with these improvements commensurate with the return of passenger levels.
5-4	Lydia Edwards, Boston City Council, District 1	Air Quality/Emissions, Noise, Transportation	Massport can partner in supporting our area public transit systems to compensate for airport related vehicle traffic. To do so, it could establish an operating subsidy for ferry service, support an expansion in the MBTA Blue Line's capacity, to offset traffic congestion. As noted, if any revenue from Massport's airports are ineligible for these uses, Massport could direct revenues from land leases elsewhere in Boston to help implement these priorities.	The ESPR analyzes and reports performance in HOV mode share, parking demand, and other ground access and air quality statistics under the existing EDR/ESPR process. Massport continues to look at ways to improve HOV access to the Airport, including partnering with the MBTA to improve access, reliability, and frequency on transit services supporting the Airport. Massport's ground transportation strategy is designed to provide a broad range of HOV, transit, and shared-ride options for travel to and from Logan Airport and to minimize vehicle trips, by providing convenient transit, shuttle, bike, and pedestrian connections to the Airport. Massport also offers free shuttle services from Logan Airport to the Blue Line at Airport Station and to the Red and Silver Lines at South Station.

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5-5	Lydia Edwards, Boston City Council, District 1	Air Quality/Emissions, Noise, Transportation	Massport can shift car rentals at Logan Airport toward electric vehicles by partnering with or incenting car rental companies to offer preferential rates and/or expanding advertising for electric vehicles, and by partnering with city and state government and area utilities to continue to grow and map electric vehicle charging locations.	Massport is willing to conduct discussions with car rental companies to shift car rental use toward electric vehicles by incentivizing preferential rates and/or expanding advertising for electric vehicles are noted. Massport has recently expanded electric vehicle charging infrastructure at key locations across Logan Airport.
5-6	Lydia Edwards, Boston City Council, District 1	Air Quality/Emissions, Noise, Transportation	Massport can also collaborate with city and state stakeholders to develop zoning and building standards for new development, or for substantial retrofits, to ensure construction is adequately insulated and ventilated to address nearby air pollution from transportation sources such as airplanes and off-highway emissions.	Massport is open to and can engage in conversations with city and state stakeholders to develop zoning and building standards for new development or substantial retrofits to ensure construction is adequately insulated and ventilated to address nearby air pollution from transportation sources such as airplanes and off-highway emissions. In addition, Massport continues to pursue Leadership in Energy and Environmental Design (LEED) certification for all Massport projects, and encourage similar pursuit for tenant projects.
5-7	Lydia Edwards, Boston City Council, District 1	Air Quality/Emissions, Forecasts	First, the Commonwealth should thoroughly review Massport's projections for both passenger growth and air pollution and comment as to whether past inaccuracies have been resolved.	For over three decades, the annual EDRs/ESPRs document and report on existing conditions associated with airport activities. Massport is the only airport in the country that provides this annual update on ground access, noise, air quality, water quality, and sustainability efforts. The forecasts and studies conducted for the EDRs/ESPRs follow industry best practices.
5-8	Lydia Edwards, Boston City Council, District 1	Air Quality/Emissions, Environmental Justice	Second, understanding the present burdens on the environmental justice community of East Boston, the Commonwealth should require air pollution reductions and strategies to provide air filters to community residents in their homes and in the public facilities which they frequent.	Massport has in place an extensive noise and air emissions mitigation program that benefits all communities but especially nearby communities including East Boston, Chelsea, Revere, South Boston and Winthrop; these communities include Environmental Justice (EJ) areas. This program includes time/location limits on engine runups, late night runway use preference, single engine taxiing, gate plug-in technology, runway use limitations, sound insulation to eligible residents, aircraft towing requirements, noise abatement turns. Massport continues to work with FAA, research institutions like MIT and the MCAC to look for ways to reduce impacts and expand research including on UFP. Massport also is working with the East Boston Health Center to target health measures for vulnerable populations. The EDR/ESPR process includes community outreach and provides translation option for Spanish.
6-1	Christopher Webb-Director of Public Health & MCAC Member-Malden, MA	Noise	Malden would like to have a decibel measurement device located in proximity to the flight path over Malden, so that the next ESPR can include Malden specific data relative to aircraft noise.	Massport's current noise monitoring system and location of microphones have been set to capture the overall noise exposure around Logan Airport over all runway ends and in a broad geographic area. The EDRs/ESPRs utilize FAA-approved modeling to capture more detail on noise exposure around Logan Airport. Massport provides specific noise information based on this modeling result. Refer to Appendix H, *Noise Abatement* of this *2018/2019 EDR* for more information.
7-1	Select Board Town of Milton, MA	Noise	We urged, and we repeat this request, that Massport and the Secretary must move to a more updated method for noise assessment (e.g., N70, which focuses on the number of noise events greater than 70 dB(A) 1), and either discontinue using the DNL standard, or reduce the threshold at which noise impacts are considered significant, as well as increase the frequency with which it is calculated.	The EDRs/ESPRs report on a variety of metrics related to noise impacts including FAA approved day-night average sound level (DNL) metric as well as supplemental noise, runway use, and flight metrics. There is also substantial data by towns provided in the Appendix H, *Noise Abatement* .

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7-2	Select Board Town of Milton, MA	Forecasts, Noise, Air Quality	We continue to urge real and substantive collaboration between Massport, the Secretary, and the communities impacted by Logan overflights. Multiple communities surrounding Logan (not just Milton) take the brunt of the impact of the operations of Logan, and the situation has worsened substantially since the FAA implemented NextGen. These communities should have direct and regular access to Massport and the Secretary, and both agencies should be willing to work on real and meaningful solutions to address the problems from airport operations - especially noise and pollution - occurring in those communities.	Massport staff engages with the Massport Community Advisory Committee (MCAC) on concerns related to Logan Airport and environmental impacts. Concerned communities, including the Town of Milton, participate regularly in these meetings.
7-3	Select Board Town of Milton, MA	Forecasts, Noise	With respect to the MIT study, three years after it began, Milton's requests for specific analysis and relief through that study have not yet been acted upon.	As part of the ongoing RNAV Study, MIT has investigated a number of opportunities to reduce the impacts of aircraft overflights of the Town of Milton. MIT provided a detailed briefing to the MCAC in September 2020.
7-4	Select Board Town of Milton, MA	Flight Forecasts, Noise, Air Quality, Community Engagement	There needs to be a better balance between the economic success of the region and the duty of Massport and the airline community to protect the neighbors and communities underneath the publicly owned airspace through which they travel.	Massport considers economic and environmental goals as compatible. Demand for air travel at Logan Airport is driven by macro, socio economic conditions and demographics. Logan Airport as a transportation facility does not drive demand but accommodates the demand that is generated locally and regionally. The Boston region is a diverse, dynamic, world-class economy including high tech/biotech, health care, higher education, finance, desirable tourist destination and residents that travel. For this reason, Massport has a broad strategy to increase HOVs and reduce single occupancy vehicles, increase use of regional airports, and implements environmental initiatives detailed in the EDRs/ESPRs. Massport has invested over $100M in Worcester Airport including a new CATIII bad weather technology. This has resulted in attracting regularly scheduled, commercial service. Hanscom continues to be New England's second busiest airport with ongoing investments expanding corporate jet service.
7-5	Select Board Town of Milton, MA	Forecasts	Given Massport's persistent understatement of the growth of its Logan operations, we believe the Secretary should not accept the 2017 ESPR as an accurate baseline planning tool without further scrutiny, and should require Massport to justify and explain why its ESPR projections consistently fall short of foreseeable growth rates.	As is evidenced by the ongoing COVID-19 pandemic, any forecast can be altered drastically and without warning in ways that can cause rapid increases or decreases in aircraft operations and passenger activity levels. As part of the EDR/ESPR process, Massport is required to prepare periodic forecast updates. These updated forecasts allow for the review of local, national and international aviation and economic trends in an effort to provide the most relevant data at the time of document filing. As with all forecasts, these are based on best available information and subject to change. Future ESPRs build on those prior experiences and the latest industry information to update expectations on growth and impacts on passenger and flight demand. The next ESPR will provide updated forecasts. At the time of this filing, Logan Airport was operating at levels not seen since the 1970s; with recovery to 2019 levels not expected for at least five years. The dramatic reduction in Logan activity (between 80-90 percent decrease in passenger levels in spring 2020) has also translated to a substantial reduction in community impacts. These initial impacts will be analyzed in the *2020 EDR*. As Massport begins to better understand future passenger activity and aircraft operations trends, forthcoming EDRs will outline the continuing and evolving strategies to minimize operational and environmental impacts of Logan Airport operations.
7-6	Select Board Town of Milton, MA	Flight Paths	We request that the Secretary work with the FAA, Massport, and Milton to implement late night aircraft restrictions similar to those set fourth in 740 CMR 24.04, which are protective of Milton and its residents.	Current Logan Airport noise abatement procedures include higher shoreline crossings, noise abatement turns and late night runway preferences to reduce flights over densely populated areas, including Town of Milton, and increase over the water flights when possible.

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7-7	Select Board Town of Milton, MA	Flight Paths, Noise	In particular, it is important to discuss restrictions on RNAV usage and routes that overfly residential neighborhoods, including spreading the routes further so that the nighttime noise is less concentrated in residential neighborhoods, or moving routes over the ocean during certain periods of time.	Current Logan Airport noise abatement procedures include higher shoreline crossings, noise abatement turns and late night runway preferences to reduce flights over densely populated areas and increase over the water flights when possible. The Area Navigation (RNAV) Study is based on a Memorandum of Understanding (MOU) between FAA and Massport committing both organizations to look for opportunities to reduce impacts stemming from FAA's NextGen modernization for the air space system. This is a unique, innovative program with technical work being performed by MIT as independent experts. The study began in 2017 and continues with ideas to increase over the water procedures and reducing flight concentration. Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Boston communities, on a regular basis and continues to work on looking for measures to reduce overflight noise. As part of the Boston Logan Airport Noise Study (BLANS), the Logan Airport Community Advisory Committee chose not to pursue a new PRAS and could not come to agreement given the difficult discussion related to sharing of overflight noise. Massport will collaborate with MCAC (legislated advisory committee to Massport and superseded the Logan Airport CAC) if it chooses to undertake a new PRAS effort.
7-8	Select Board Town of Milton, MA	Flight Paths, Noise	Specifically, as there are already nighttime restrictions on arrivals to runway 4L, we request that the same restrictions (no arrivals between 11:00 PM and 6:00 AM) for runway 4R. See Massachusetts Port Authority Noise Rules and Regulations I.1(b), Summary of Runway Use Restrictions, Boston Logan International Airport (May 2, 2016) (also referenced in FAA BOS ATCT Noise Abatement Order 7040.1H.).	Noise restrictions to Runway 4L are related to departures, and there is currently no nighttime restriction for Runway 4L arrivals. However, Massport has nighttime-over-water preference procedure, to reduce and minimize noise impacts on nearby communities including Town of Milton.
7-9	Select Board Town of Milton, MA	Air Quality, Noise	The 2017 ESPR only discusses air pollution from airport operations in the context of the actual operations of Logan Airport, on Logan property. We repeat our comments to the 2014 and 2015 EDRs that this perspective is overly and conveniently narrow.	The EDRs/ESPRs focus on Logan Airport's operations, plans, analysis and impacts. These reports use accepted industry practice to collect, report and analyze appropriate operational data and key environmental metrics related to aircraft activity, ground access, noise, air emissions and other relevant information.
7-10	Select Board Town of Milton, MA	Air Quality, Noise	We request that the Secretary direct Massport, in conjunction with the Department of Public Health ("DPH") and the Department of Environmental Protection ("DEP"), to conduct noise and air pollutions studies in communities like Milton which receive a substantial number of low-flying arrival aircraft.	Chapter 7, *Air Quality/Emissions Reduction* provides updated information regarding recent and ongoing scientific studies associated with airport emissions including the *Logan Airport Health Study* by Massachusetts Department of Health (2014), *Impacts of Aviation Emissions on Near-Airport Residential Air Quality* by Tufts University (2020), and similar airport-related health studies by the University of Southern California and University of Washington. The findings show key differences exist in the particle size distribution and the black carbon concentration for roadway and aircraft features.
7-11	Select Board Town of Milton, MA	Air Quality, Noise, Flight Path	We further request that the scope of the future EDRs be expanded to consider the health impacts from increased and concentrated arrival and departure operations due to RNAVs, and that pollution data to be measured for every community under any of the many Logan RNAVs, and that no new RNAV overflight paths be put into use until such study is complete and all parties agree that no addition detrimental effects will be experienced by residents in communities bearing the brunt of low-flying airplane overflight.	The noise and air quality modeling conducted for the *2017 ESPR* considers the volume of aircraft operations and therefore the air quality modeling results account for any increases or decreases in the number of aircraft arrivals and departure operations. Since ESPRs focus on forecasting and the future outlook of passenger and operations at Logan Airport, the noise and air quality modeling discussed in the *2017 ESPR* includes a discussion and analysis of the forecasted activity levels. Noise modeling accounts for aircraft location and therefore reflects the concentration of noise impacts in the surrounding communities.
7-12	Select Board Town of Milton, MA	Air Quality, Noise, Flight Path, Community Engagement	We request that the Secretary work with Massport, Milton, the MCAC, and other affected communities to help remedy the multiple impacts discussed above.	The state legislature created the Massport Community Advisory Committee of which the Town of Milton is an active member. The MCAC was created exactly for this purpose to engage with Massport on areas of interested to the nearby communities including impacts related to airport operations.

Comment #	Author	Topic	Comment	Response
7-13	Select Board Town of Milton, MA	Forecasts, Environmental	… not to certify the 2017 ESPR and to direct Massport to prepare a Supplemental ESPR which fully and realistically addresses projected increases to Logan operations and airport throughput, and the resulting environmental impacts;	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic (typically every 5-6 years) ESPR forecasts of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. A benefit of the EDR/ESPR process is that these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue to reduce community impacts from Logan operations.
7-14	Select Board Town of Milton, MA	Noise, Flight Paths	Work with the FAA, Massport, and Milton to develop and implement late-night aircraft consideration of an 11:00PM to 6:00AM landing prohibition on runway 4R;	The state legislature created the Massport Community Advisory Committee of which Milton is an active member. The MCAC includes over 30 communities. Massport believes that discussions related to limiting runways and use, and potential shifting of noise impacts, should be had with all communities. Also, there are federal regulations that severely limit an airport's ability to restrict use and access to users of the nation's airspace system.
7-15	Select Board Town of Milton, MA	Flight Paths	Direct Massport and the MCAC to promptly develop a system for the fair and equitable distribution of aircraft overflights that provides real relief to the highly impacted surrounding communities, especially those that are under multiple RNAVs;	Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Boston communities, on a regular basis and continues to work on looking for measures to reduce overflight noise. As part of the Boston Logan Airport Noise Study (BLANS), the Logan Airport Community Advisory Committee chose not to pursue a new PRAS and could not come to agreement given the difficult discussion related to sharing of overflight noise. Massport will collaborate with MCAC (legislated advisory committee to Massport and superseded the Logan Airport CAC) if it chooses to undertake a new PRAS effort.
7-16	Select Board Town of Milton, MA	Flight Paths, Noise	Direct Massport to collaborate with DPH and DEP to develop and conduct noise and air pollution studies in highly impacted surrounding communities, especially those that are under multiple RNAVs:	Chapter 7, *Air Quality/Emissions Reduction* provides updated information regarding recent and ongoing scientific studies associated with airport emissions including the *Logan Airport Health Study* by Massachusetts Department of Health (2014), *Impacts of Aviation Emissions on Near-Airport Residential Air Quality* by Tufts University (2020), and similar airport-related health studies by the University of Southern California and University of Washington. The findings show key differences exist in the particle size distribution and the black carbon concentration for roadway and aircraft features.
7-17	Select Board Town of Milton, MA	Flight Paths, Noise, Air Quality	Direct Massport to consider off-airport noise and pollution impacts, including but not limited to the health impacts from increased and concentrated arrival and departure operations due to RNAVs, in all communities under any RNAV, in all future EDRs	The ESPRs/EDRs report on off-airport impacts including: runway use, flight tracks, noise monitor readings, and DNL and air emissions modeling that capture off-airport flight paths.
7-18	Select Board Town of Milton, MA	Flight Paths, Noise, Air Quality, Forecasts	Direct Massport to include all of the points made above in the scope of the 2017 ESPR. This includes impacts to health from noise and pollution from: off-airport impacts of growth, cumulative impacts of RNAV overflights, increased nighttime operations, moving to updated noise measurements which are more protective of human health and which account for acute impacts more realistically than the DNL standard; and working directly with impacted communities to more fully understand and evaluate the human health effects from Logan operations.	The *2018/2019 EDR* responds to the Secretary's Scope on the *2017 ESPR* dated November 25, 2019. Refer to Chapter 6, *Noise Abatement* for an update on runway use, flight tracks, aircraft operations and aircraft types, noise contours and the sound insulation program. The assessment follows FAA-required standards and methodology for noise impact assessment.
7-19	Select Board Town of Milton, MA	Flight Paths, Noise, Air Quality, Forecasts	Include the hours from midnight to 7:00 AM in the dwell and persistence calculations to provide a clearer indication of the noise burden being borne by communities subject to nighttime operations.	The dwell and persistence metric is based on an established definition as part of the original PRAS system. Although PRAS is no longer in affect, the ESPRs/EDRs provide this metric for informational purposes and to track overtime. See Chapter 6, *Noise Abatement* for more information.

Comment #	Author	Topic	Comment	Response
8-1	AIR, Inc- Chris Marchi, Vice President	Community Engagement	EEA to continue our recent helpful dialogue in developing further advances in community engagement and collaboration We urge EEA to extend its 2017 ESPR response period beyond the traditional 7 day period to provide opportunity for MEPA to collect further public feedback on acceptable standards of response.	The comment period for the *2017 ESPR* was from August 7, 2019 to October 29, 2019, nearly three times the length of the statutory 30-day MEPA comment period.
8-2	AIR, Inc- Chris Marchi, Vice President	Forecasts (airport growth and projections)	We ask EEA to manage this risk by requiring Massport to develop and analyze a High Passenger and Aircraft Growth Scenarios which is based upon recent actual growth rates in a Supplemental ESPR submission. These High Growth Scenarios should be accompanied by impact forecasts, and mitigation and policy strategies and implementation schedules which seek to protect the public from adverse increased impacts proactively. We ask that EEA require Massport to provide supplemental reporting and description regarding PM levels over the period between 2010 and 2017 which provides reviewers with an understanding of the level of growth or decline of this important pollutant, as well as an understandable narrative as to the causes and implications of changes in modeling.	As part of the EDR/ESPR process, Massport is required to prepare periodic forecast updates. These updated forecasts allow for the review of local, national and international aviation and economic trends in an effort to provide the most relevant data at the time of document filing. The ESPRs include forecasted demand levels which are then modeled to estimate future noise and emissions trends. While passenger levels reached a new milestone in 2019, in March 2020, flights in and out of Logan Airport were dramatically reduced and passenger levels dropped by over 90 percent at the peak of the COVID-10 pandemic in the spring and summer of 2020. While recovery is expected, the timeline for a return to recent levels is not yet known. The *2020 EDR* will provide the best available information. As always, the EDRs/ESPRs will provide regular updates on operational and environmental impacts and Massport's strategies to minimize those community impacts. Massport will continue to report on actual and forecasted levels of PM_{10} and $PM_{2.5}$, along with other key emission factors. Massport also reports on any major model changes that may result as FAA is continuously updating its noise and air emissions model AEDT.
8-3	AIR, Inc- Chris Marchi, Vice President	Air Quality, Noise	EEA [should] require Massport to compile a separate chapter in ESPR and EDR documents which lists and discusses the major research findings around health and airport impacts, presents maps of likely pollution and noise health impacts, and commits the Port Authority to the net reduction of and mitigation of those impacts. We ask that EEA require Massport to produce noise impact estimates based upon High Growth Scenarios such that MEPA and other noise impacted stakeholders can reasonably assess future noise impacts.	Chapter 7, *Air Quality/Emissions Reduction* summarizes a number of recent and current aviation studies on aircraft emission and the evolving studies of associated public health effects. Massport will continue to provide annual updates as available through the EDR/ESPR process. Massport continues to present information on research findings on public health, including noise and air emissions. Refer to Chapters 6, *Noise Abatement* and 7, *Air Quality/Emissions Reduction* for more information about recent study findings. Massport will continue to advance strategies for reducing overall Logan Airport-related impacts. Massport planning forecasts tend to be more optimistic by emphasizing, in the near term, airline plans and, in the long term, economic/industry fundamentals. Presenting even more optimistic scenarios, out of sync with industry and FAA forecasting expectations will not provide meaningful feedback. An approach which Massport will continue is to benchmark the planning forecast to FAA and other industry expectations.

Comment #	Author	Topic	Comment	Response
8-4	AIR, Inc- Chris Marchi, Vice President	Economic Impacts	We ask that EEA require that Massport remove any reference to the flawed and inaccurate CDM Smith Statewide Airport Economic Impact Study Update and incorporate data and analyses around the cost of airport related health impairments, lost productivity, reduced property values, tax base and rents, and other negative economic impacts into a supplemental reporting and analysis of the economic impacts of Logan for this ESPR. We ask that EEA require Massport to produce economic, traffic and impact modeling which evaluate how changes in landing fee structure, investments in ground access, and other initiatives to increase the share of New England's air travel needs served by regional airports could affect local economic conditions, airline routing, and consumer purchase behavior, as well as their potential to achieve off-loading of flights, to other viable New England Airports, including TF Green and Manchester Boston.	The MassDOT Economic Impact Study is an accepted industry approach to quantify the economic benefits airport systems provide. When appropriate, Massport will continue to incorporate such studies in the EDRs/ESPRs. Each EDR/ESPR strives to present accurate analyses of Logan's impacts on our neighboring communities. We rely on state and federal scientific studies of the public health impacts of aviation and associated regulations. As the science evolves, Massport presents summaries and links to these technical studies were applicable. This *2018/2019 EDR* was prepared during the COVID-19 pandemic, at a time when all international aircraft activity has been reduced. The regional airports have been particularly hard hit. With the significant decrease in regional activity levels, it is unlikely that there will be much "off-loading" of flights in the near term. Forthcoming EDRs/ESPRs will continue to track regional airports activities and strategies to meet demand throughout the region.
8-5	AIR, Inc- Chris Marchi, Vice President	Impacts	We ask that EEA use the above referenced collaborations and engagement tactics to create a constructive dialogue around health and develop a list of viable air quality, noise, and traffic mitigation opportunities, policies, and strategies.	Massport has participated in two calls with AIR, Inc. to discuss the EDR/ESPR process and associated impact reduction strategies. We expect to have additional discussions as the process moves forward.
8-6	AIR, Inc.- Chris Marchi, Vice President	Ground Access	We ask that EEA require Massport to produce ground access mitigation plans which protect our regional roadway capacity under High Growth Scenarios requested above.	If activity levels continue to exceed the 2017 forecast, the next ESPR may be required to include additional analysis of a high-growth scenario. Based on the 2020 activity levels, which have dropped to levels last seen at Logan Airport in the mid-1970s, Massport does not see a near-term scenario where Logan would meet or exceed the *2017 ESPR* forecasts. Future EDRs/ESPRs will track and report on the recovery.
8-7	AIR, Inc.- Chris Marchi, Vice President	Ground Access	Specifically, we ask EEA to require Massport to model traffic levels under a broader set of alternative policies including vastly expanded Logan Express service including multiple new terminals, increased frequency, additional destinations, a variety of pricing scenarios for remote parking and fares, additional cost-reduction and benefit features such as security line priority and dedicated bus lanes, and well as; completion of the Red to Blue Connector, extension of the Blue Line to Lynn, and Expanded Water Ferry service within the inner harbor and beyond.	As discuss throughout this *2018/2019 EDR*, due to the COVID-19 pandemic, Logan Airport's activity levels in 2020 mirrored levels last seen in the mid-1970s. Together with the traveling public's reluctance to use public transportation due to COVID-19-related concerns, and the overall decrease in passenger and ground traffic levels, expansion of HOV services is not currently feasible or practicable. Future EDRs/ESPRs will track the recovery and provide updates on Massport's response.
8-8	AIR, Inc.- Chris Marchi, Vice President	Regional Transportation	2017 ESPR should evaluate the benefits of a more balanced regional airport system.	Both EDRs and ESPRs track activity at the regional airports to help understand what measures those airports are taking to better serve their local markets. In response to the COVID-19 pandemic, airlines have reduced service at all airports including Logan Airport. Future EDRs and ESPRs will continue to address regionalization strategies.
8-9	AIR, Inc.- Chris Marchi, Vice President	Ground Access	EEA should require Massport to develop multiple Remote Terminal Scenarios in which vastly expanded and improved suburban Logan Express facilities can serve as transportation hubs with service to and from not only Logan, but also to and from other regional airports, business centers and downtown.	Prior to the COVID-19 pandemic, Massport was aggressively moving forward with new and expanded HOV services inclosing expansion of Logan Express service hours, facility enhancements and expansion of the Logan Airport Express's Framingham Garage. In late 2019, Massport also purchased new buses for the planned new North Station to Suburban Logan Airport Express Service. As with many planned HOV enhancements prior to the COVID-19 outbreak, those services have been suspended, reduced or deferred based on ridership demand and reduced revenues. The *2020 EDR* will provide updates, as available.

Comment #	Author	Topic	Comment	Response
8-10	AIR, Inc- Chris Marchi, Vice President	Flight Path	We ask that EEA require Massport to update PRAS to reflect current population-weighted impacts which incorporate changes in annual flight patterns which have occurred over the past 25 years. As part of an effective Runway Use Program, flight paths must be spread out fairly and the incredibly damaging RNAV navigation systems which create devastating sky-highways must be split up into multiple routes, giving much needed respite to the towns below.	Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Boston communities, on a regular basis and continues to work on looking for measures to reduce overflight noise. As part of the Boston Logan Airport Noise Study (BLANS), the Logan Airport Community Advisory Committee chose not to pursue a new PRAS and could not come to agreement given the difficult discussion related to sharing of overflight noise. Massport will collaborate with MCAC (legislated advisory committee to Massport and superseded the Logan Airport CAC) if it chooses to undertake a new PRAS effort.
9-1	Airlines for America- Tim Pohle, Senior Managing Director Environmental Affairs	Emissions/Air Quality/ GSE	We respectfully request that the Draft Project §61 Findings for the Parking Project at Boston-Logan International Airport (as presented in Appendix C of the Draft EIR/EA), be amended to reflect that any GSE program will be voluntary and exclude any provision relating to commercial aircraft taxiing. Because the Draft EIR/EA itself establishes that there is no need to reduce GSE (or any) emissions to allow the Project to go forward and any mandate to reduce emissions from GSE would preclude both Massport and airlines from accessing significant sources of funding to accelerate the deployment of low-emission and/or eGSE, if the Final Section 61 Findings document addresses GSE, it should provide for the development of a voluntary GSE program. In addition, while we appreciate the recognition that alternative GSE must be "commercially available" as a predicate to any requirement to convert or replace GSE, the Final Section 61 Findings must recognize that "commercial availability" alone is not sufficient to establish the viability of deploying eGSE. The Final Section 61 Findings must acknowledge that any mandate to deploy eGSE must also be predicated on findings that (a) sufficient infrastructure is in place to accommodate and support such equipment and (b) operation of eGSE is viable as a practical matter (i.e., that it is capable of performing the tasks of the equipment it will replace without compromising the safety and efficiency of aircraft operations).	The Logan Airport Parking Project has completed both MEPA and NEPA review processes, and all required environmental permits are in place. This project is temporarily on hold and a final Section 61 Finding has not been issued. Massport continues to work with the airlines towards conversion of Logan Airport's GSE fleet.

Comment #	Author	Topic	Comment	Response
9-2	Airlines for America- Tim Pohle, Senior Managing Director Environmental Affairs	Emissions/Air Quality/ GSE	Section 61 Findings also must acknowledge that it is inappropriate to require the turnover of “all” GSE by any date certain, even if all of these predicates are met, without first evaluating and analyzing the cost-effectiveness of converting or replacing equipment before its useful life has been attained. Moreover, the Final Section 61 Findings must recognize that any reasonable policy regarding the replacement of GSE will include reasonable exceptions for low-use equipment. With respect to “commercial availability,” the Final Section 61 Findings also must acknowledge that this can be a difficult concept to define with respect to GSE. As such, before establishing any policy specifying the scope and schedule for replacing GSE, “commercial availability” must be carefully defined. Such a definition must acknowledge that “commercial availability” necessarily requires that the equipment is available at a commercially reasonable price. In addition, the process and criteria must also be defined for determining whether (a) specific equipment is “commercially available,” (b) sufficient infrastructure is in place to support deployment of eGSE, (c) the eGSE in question can be practically operated at BOS and (d) conversion of GSE to eGSE is cost-effective.	Massport is committed to implementing its ground service equipment (GSE) electrification initiative, as outlined in the updated Draft Section 61 Findings and provided for in other commitments. Working closely with airlines, fixed base operators, and others, Massport is committed to implementing the GSE electrification initiative for commercially-available equipment in a cost-effective manner. Working closely with airlines, fixed base operators, and others, Massport is committed to implementing its GSE electrification initiative in a cost-effective manner. In particular, the initiative is structured so existing equipment will only be replaced once replacement eGSE is commercially available. Generally, existing GSE will only be replaced with eGSE once it is at least eight years old.
9-3	Airlines for America- Tim Pohle, Senior Managing Director Environmental Affairs	Environmental/ Emissions/ GSE	Earlier this year, A4A submitted comments on the "Draft Environmental Impact Report/Environmental Assessment EEA #15665 - Logan Airport Parking Project." In those comments, we expressed our general support for initiatives aimed at reducing GSE emissions and our commitment to working with Massport to achieve its emission reduction goals through reasonable, well structured GSE programs. We also identified and discussed at length the many considerations beyond "commercial availability" that must be taken into account when implementing any effort to electrify GSE. We attach those comments here and respectfully request that they be included in the record and considered in relation to the GSE electrification initiative identified in the BOS 2017 ESPR.	Thank you for submitting the comments from the Parking Garage Project, which are now part of the record. A4A's comments will be considered as Massport moves forward with the GSE program as described above.

Comment #	Author	Topic	Comment	Response
10-1	Staci Rubin, Conservation Law Foundation	Environmental/ Forecasts (airport growth and projections)	Given that growth is a primary driver of public health and environmental impact, and consequently will determine the scale of Massport's obligations and opportunities to avoid, minimize, and mitigate environmental harm, CLF submits that the ESPR should be withdrawn and revised to include more realistic growth scenarios, including a scenario in which the rate of growth equals that of recent years, while addressing other deficiencies recited in our detailed comments below. The ESPR must describe the nature and extent of the proposed environmental impacts, all measures to minimize said damage, adverse short-term and long-term environmental consequences that cannot be avoided, and reasonable alternatives. Further, CLF requests that Massport provide a revised ESPR with a high growth scenario forecast of passenger growth. Noting these discrepancies, CLF urges Massport to clarify the derivation of its 1.5 percent annual growth rate for passengers and 1.1 percent annual growth rate for aircraft operations, especially because these rates provide the basis for estimating future environmental impacts, while potentially affecting the schedule by which Massport should upgrade its ground transportation infrastructure. CLF seeks additional detail in the ESPR regarding ground transportation to conform with the Massport-CLF agreement. As this was a component of the Massport-CLF agreement, Massport should explicitly include the free Blue Line service program for employees in the ESPR. CLF requests that Secretary Theoharides and the MEPA staff work with Massport to withdraw the ESPR and refile it in accordance with 301 CMR 11.08(5) to allow for revised passenger counts and associated mitigation measures for another public comment period. Alternatively, the Secretary should find that the ESPR is inadequate and require Massport to file a supplemental EIR in accordance with 301 CMR 11.07.	This *2018/2019 EDR* analyzes the continued growth in airport activity through 2019 and describes the community and environmental impacts of that activity. This EDR also provides initial consideration of the dramatic decline in Airport activity following the outbreak of COVID-19 in March 2020. Beginning in March 2020, flights in and out of Logan Airport were dramatically reduced and passenger levels dropped by over 90 percent at the peak of the pandemic in the spring and summer of 2020. As a result, there are far fewer aircraft operations and passengers and a dramatic drop in overall Logan Airport activity. While activity levels began a slow recovery in mid-summer 2020, the ongoing wave of COVID-19 cases has resulted in continued historically low levels of activity, with a full recovery years away. As of October 2020, total flight operations for the year were down by 50 percent and passenger levels were down by about 70 percent compared to January through October 2019. Massport expects that by the end of 2020, passenger levels will have dropped to levels of activity not seen since the mid-1970s As a result, there are far fewer aircraft operations and passengers and a dramatic drop in overall Logan Airport activity. While activity levels began a slow rebound in mid-summer 2020, national and international aviation activity forecasts suggest a several year recovery to regain pre-COVID-19 conditions. As the longer-range impact of the pandemic become clearer, Massport expects to be able to present updated forecasts pertaining to the anticipated recovery. The *2020 EDR* will present the best information at that time. The dramatic reduction in Logan Airport activity has also translated to a substantial reduction in community impacts. These initial impacts will be analyzed in the *2020 EDR*. As Massport begins to better understand future passenger activity and aircraft operations trends, forthcoming EDRs will outline the continuing and evolving strategies to minimize operational and environmental impacts of Logan Airport operations. As a direct impact of the COVID-19 pandemic, 2020 passenger levels are projected to be at or below levels experienced in the mid 1970s what Logan Airport handled around 9 million annual passengers. Massport expects to be able to provide an update on projected future levels as part of the *2020 EDR*. Flights in and out of Logan Airport are dramatically reduced and passenger levels dropped over 90 percent during spring 2020. As a result, while passenger numbers are beginning a slow recovery, there are far fewer passengers and employees traveling to and from Logan Airport and there is far less roadway congestion both in Boston and the metropolitan area. In addition, the public's interest in using high-occupancy vehicles (HOVs) transportation services like buses, rapid transit and commuter rail, has also been significantly affected by concerns about COVID-19. Massport is committed to the CLF agreement and will continue to report on progress towards meeting those items, subject to current conditions.
10-2	Staci Rubin, Conservation Law Foundation	Ground Access	However, Massport should clarify whether these improvements will allow it to meet the its capacity goal, and to consider the implementation of discounted and free trips as well as security line prioritization for suburban express services in Braintree, Framingham, Peabody and Woburn Logan Express services.	The 2019 service enhancements met or exceeded the 10 percent capacity enhancement. As described in the Chapter 5, *Ground Access to and from Logan Airport*, a number of the ground access/HOV enhancement implemented in 2019 have been adjusted or suspended due to the COVID-19 pandemic that results in significant passenger and ridership reductions. Future EDRs/ESPRs will provide updates on those services as available.
10-3	Staci Rubin, Conservation Law Foundation	Ground Access	Notwithstanding the agreement for TNC trips to be credited as HOV trips, the TNC trips constitute a larger than expected portion of the HOV and Massport should consider discounting the TNC trips in some way.	Massport will re-evaluate the RideApp services once there is a better understanding on the recovery of passenger levels and overall Logan Airport activity levels. Future EDRs/ESPRs will provide updates on those services as available.
10-4	Staci Rubin, Conservation Law Foundation	Ground Access	Massport should explicitly explain how it is incentivizing ride-sharing in the ESPR through a per-trip fee rather than a per-person fee.	Massport has implemented a RideApp fee for shared rides that is lower that the fee charged for non-shared rides, thereby providing an incentive for use of HOV RideApp products.
10-5	Staci Rubin, Conservation Law Foundation	Ground Access	Massport notes that "parking pricing review" is ongoing but does not provide detail on whether it plans to study variable rate pricing structures. The ESPR should clarify Massport's plans for study of variable rate parking.	Massport studied variable rate pricing policy as part of the DEP parking freeze amendment studies, *Logan Airport Parking Freeze Amendment Ground Access and Trip Reduction Strategy Studies.* This document can be found on the Massport website, http://www.massport.com/media/3370/final-massport-dep-report.pdf. Massport continues to evaluate variable rate pricing as a potential parking management and VMT reducing strategy.
10-6	Staci Rubin, Conservation Law Foundation	Emissions	CLF continues to encourage and support Massport's efforts in reducing emissions from its GSE, and in its GHG reduction initiatives and investments in renewable energy.	As discussed in Section 7, *Air Quality/Emissions Reductions*, Massport is continuing to advance its plans for GSE conversion at Logan Airport and investments in renewable energy.

Comment #	Author	Topic	Comment	Response
10-7	Staci Rubin, Conservation Law Foundation	Air Quality	CLF encourages the continuation of the programs Massport has created to mitigate the effects of airport pollution, including an agreement to provide funding to the East Boston Neighborhood Health Center to treat and prevent asthma and COPD, and its agreements with MassDPH and the Massachusetts League of Community Health Centers. Reconcile air quality forecasts with activity forecast. Massport total emissions of carbon monoxide, particulate matter (PM) PM10/PM2.5, and Volatile Organic Compounds (VOCs) are predicted to decrease further by about 2 percent, 10 percent, and 8 percent, respectively, compared to 2017 levels. These estimations were made considering Massport's forecasted passenger and air operations growth, which as noted previously, could potentially be underestimated. Once Massport clarifies these growth rates and predictions, it should also clarify whether these reductions still apply. As the effects of climate change progress, Massport should consider its ability to mitigate negative air quality effects as a matter of public health. Moreover, CLF strongly encourages Massport to work with community-based organizations to collaboratively determine how to further mitigate air quality impacts through installation of air filters that significantly reduce the amount of particulate matter, including ultrafines.	Massport has in place an extensive noise and air emissions mitigation program that benefits all communities but especially nearby communities including East Boston, Chelsea, Revere, South Boston and Winthrop. These communities include EJ areas. This includes time/location limits on engine runups, late night runway use preference, single engine taxiing, gate plug-in technology, runway use limitations, soundproofing to eligible residents, aircraft towing requirements, mad noise abatement turns. Massport continues to work with FAA, research institutions like MIT and the MCAC to look for ways to reduce impacts and expand research including on UFP. Massport also is working with the East Boston Health Center to target health measures for vulnerable populations. The EDR/ESPR process includes community outreach and provides translation option for Spanish.
10-8	Staci Rubin, Conservation Law Foundation	Mitigation	CLF also encourages Massport to further increase its mitigation efforts related to air quality, public health, and noise.	Massport will continue to provide updates on its programs through the EDR/ESPR process.
10-9	Staci Rubin, Conservation Law Foundation	Noise	CLF suggests that noise impacts to EJ populations be mitigated and that Massport work with residents and community organizations in East Boston, Chelsea, Revere, and Winthrop to determine appropriate mitigation. CLF encourages Massport to engage in additional community meetings to discuss appropriate air quality, noise, and other mitigation measures, and work with us (and our municipalities) to build mitigation plans that address the impacts of those scenarios.	Massport has in place an extensive noise and air emissions mitigation program that benefits all communities but especially nearby communities including East Boston, Chelsea, Revere, South Boston and Winthrop. These communities include EJ areas. This includes time/location limits on engine runups, late night runway use preference, single engine taxiing, gate plug-in technology, runway use limitations, soundproofing to eligible residents, aircraft towing requirements, noise abatement turns. Massport continues to work with FAA, research institutions like MIT and the MCAC to look for ways to reduce impacts and expand research including on UFP. Massport also is working with the East Boston Health Center to target health measures for vulnerable populations. The EDR/ESPR process includes community outreach and provides options for Spanish. EDR/ESPRs provide cumulative snapshots of Logan environmental impacts and inform the public on broad efforts to reduce impacts. Mitigation efforts are related to project-specific mitigation which are the result of separate environmental processes that include extensive public outreach and input.
10-10	Staci Rubin, Conservation Law Foundation	Community Engagement	To that end, CLF encourages Massport to hold community meetings, outside of MEPA processes and after MEPA deadlines expire, to discuss ways for Massport to be a better neighbor and best implement mitigation measures associated with its environmental impacts.	Massport strives to be a good neighbor and regularly meets with community groups regarding Airport operations and impacts, projects status, upcoming projects and programs and to respond to community issues.
10-11	Staci Rubin, Conservation Law Foundation	Forecasts	CLF urges the Secretary to work with Massport to withdraw and refile its ESPR to include updated passenger growth counts and associated mitigation measures.	This *2018/2019 EDR* is prepared in accordance with the Secretary's Certificate on the *2017 ESPR*. As noted in the Certificate, the Secretary has identified the possibility of requiring additional forecasts in the event that passenger growth exceeds the 2017 forecasts.

Comment #	Author	Topic	Comment	Response
10-12	Staci Rubin, Conservation Law Foundation	Forecasts	As Massport forecasts its growth and plans its mitigation activities, the sources of these assumptions should be clear, and their implications should be explicit in the ESPR.	The EDR/ESPR process, which is exclusive to Massport, is designed to address these issues on an annual basis. Annual EDRs will continue to report on current conditions while ESPRs will incorporate updated forecasts based on best available information.
11-1	Peter Houk Medford representative Massport CAC	Forecasts	"How big is too big?" In other words what forces govern the growth of Logan International Airport and do those forces have anything to do with the increasing impacts of dramatic growth in volume at Logan on the Boston metro-area communities?	Demand for air travel at Boston Logan is driven by macro, socio economic conditions and demographics. Boston Logan as a transportation facility does not drive demand but accommodates the demand that is generated locally and regionally. The Boston Region is a diverse, dynamic, world class economy including high tech/biotech, health care, higher education, finance, desirable tourist destination and generally wealthy residents that travel. For this reason Massport has a broad strategy to increase HOVs, reduce single occupancy vehicles, increase use of regional airports and leads in environmental initiatives detailed in the EDR/ESPRs.
11-2	Peter Houk Medford representative Massport CAC	Noise	Secretary Theoharides, I ask you to consider this: people don't complain about noise unless they are truly annoyed.	Comment noted.
11-3	Peter Houk Medford representative Massport CAC	Forecasts, Noise	Citizen complaints, and the alarming increase in the number of complaints, should be taken seriously by Massport, by the FAA, and by our legislators.	Inputs from nearby communities is important to Massport including complaints received though our noise complaint system. Massport's noise abatement program has been in place since the 1980s and is an industry leader because of the strong local community engagement efforts. Massport fully supports these exchanges of information and ideas. The most recent example is the RNAV Study underway after an FAA/MPA MOU with MIT, a world class academic institution, leading the effort. This is a unique effort that is has not been done anywhere else in the U.S.
11-4	Peter Houk Medford representative Massport CAC	Forecasts, Community Engagement	I do think that these entities should engage in talks with the city of Boston and surrounding cities to try to collectively answer this question of "how big is too big".	A critical role of the MCAC (of which the City of Medford is a member) is to provide input and be a voice in the broader regional dialogue regarding air transportation, its critical role in the economy and appropriate policies to reduce air and noise impacts when possible.
12-1	Myron Kassaraba Belmont Representative Massport CAC	Forecasts	It should be rejected as incomplete and inadequate. It is incumbent on the State to ensure that Massport's reporting be complete and forthright for both current and recent operational conditions & activity levels and in projecting likely future conditions.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
12-2	Myron Kassaraba Belmont Representative Massport CAC	Forecasts	Massport should be required to report to the State - Operations by hour to accurately capture these increases in highly sleep-disruptive early morning and late-night operations.	The EDRs/ESPRs report aircraft activity on overall and nighttime/daytime split based on FAA's definition of nighttime operations (10PM-7AM). This provides a consistent measures across communities and time periods and based on a science-based standard.
12-3	Myron Kassaraba Belmont Representative Massport CAC	Flight Paths	Required to report on the FAA's ability to utilize the Late Night Operations noise abatement procedures.	FAA's ability to utilize the nighttime, head-to-head, over the water procedure is a safety-based decision that considers dynamic operational including demand, wind speed and direction, fleet mix, etc.

Comment #	Author	Topic	Comment	Response
12-4	Myron Kassaraba Belmont Representative Massport CAC	Forecasts	Massport should be required to provide the State with historical, current and future projected passenger volume by % of Origination & Destination passengers and % of Connecting Passengers.	Origin and destination traffic refers to the passenger traffic that either originates or ends at a particular airport or market. A strong O&D market like Boston generates significant local passenger demand, with many passengers starting their journey and ending their journey in that market. O&D traffic is distinct from connecting traffic, which refers to the passenger traffic that does not originate or end at the airport but merely connects through the airport en route to another destination. Less than 10 percent of Logan Airport travelers are connecting passengers.
12-5	Myron Kassaraba Belmont Representative Massport CAC	Forecasts	The State should furthermore be asking if Massport should be continuing to provide monetary incentives to airlines to come to Boston.	The primary reason that any airline chooses to serve Logan Airport is the passenger demand, regional economy and other fundamental socio-economic factors related to Boston and the region. Narrow, limited new entrant incentives are designed to target underserved areas of the globe that would be otherwise accessed less efficiently through a intermediary hub airports.
12-6	Myron Kassaraba Belmont Representative Massport CAC	Forecasts/ Comment Period Time	Massport needs to be encouraged to make significant investments in more comprehensive and timely reporting capabilities both in terms of systems and qualified in-house technical personnel. The 18-24 month delay in production of EDR and ESPR makes the data supplied virtually useless in terms of being actionable.	Following the *2017 ESPR* , the Secretary of EEA agreed to allow Massport to combine the 2018 and 2019 reporting years into a single EDR document to shorten the timeframes between filings.
12-7	Myron Kassaraba Belmont Representative Massport CAC	Forecasts/ MCAC	The proposed Fly Quiet Report is a very small step in that direction – but much of this aforementioned reporting, such as runway use by hour and utilization of the late night procedure should be part of the normal monthly public reporting.	Massport has worked with the MCAC, including Town of Belmont representatives, to develop the draft Fly Quiet Report. Massport also provides ongoing reporting on runway use on its website.
12-8	Myron Kassaraba Belmont Representative Massport CAC	Air Quality, Noise, Emissions, Environmental	I know others are submitting comments on important issues related to health impacts of both noise and pollution from aviation, ground transportation and airside operations. These need to be monitored and addressed.	Comment noted.
12-9	Myron Kassaraba Belmont Representative Massport CAC	Air Quality, Forecasts, Noise, Emissions, Environmental	It is my hope that these comments be given due consideration as you [EEA] assess how Logan's operations impact local residents and communities and that you take action to ensure that Massport is doing their part to adequately report and address those impacts.	Comment noted.
13-1	Matthew Romero, Massport Community Advisory Board	Year Report vs Year of Publication	While compiling this level of detailed reporting clearly takes some time, one consistent request from MCAC members has been to shorten the window between the year being reported on (2017 in this case) and the year of publication (2019).	Following the *2017 ESPR* , the Secretary of EEA agreed to allow Massport to combine the 2018 and 2019 reporting years into a single EDR document to shorten the timeframes between filings.
13-2	Matthew Romero, Massport Community Advisory Board	Comment Period Time	Another concern that has been voiced by MCAC members is the length of comment period. While this year's comment period was extended due to unique circumstances, even a 60-day comment period makes it challenging for any individual or organization to thoroughly review, vet, and comment upon such a detailed and voluminous document.	The comment period for the *2017 ESPR* was from August 7, 2019 to October 29, 2019, nearly 3 times the length of the statutory 30-day MEPA comment period.

Comment #	Author	Topic	Comment	Response
13-3	Matthew Romero, Massport Community Advisory Board	Forecasts	As many individuals, including some elected officials, at the ESPR public hearing noted there is considerable concern about Logan's projected growth and the forecasting provided in the ESPR. While forecasting is by definition an estimate, there remain the questions of both the projected pace of growth at Logan as well as its impacts upon the communities.	As part of the EDR/ESPR process, Massport is required to prepare periodic forecast updates for each ESPR. These updated forecasts allow for the review of local, national and international aviation and economic trends in an effort to provide the most relevant data at the time of document filing. As with all forecast, the are based on best available information and subject to change. Future ESPRs build on those prior experiences and the latest industry information.
14-1	Maryann Aberg Logan Aircraft Noise Working Group	RNAV, Noise, Traffic, Air Pollution, Flight Path	Massport must change its harmful and equitable policies: - Disperse flights equitably to create paths over all or most Boston area neighborhoods—not just a few narrow corridors—and make that policy the central focus of Professor John Hansman's MIT Noise Study recommendations - Mandate higher altitudes over residential areas at all times - Eliminate noise over residential areas between 10 pm and 7 and by requiring over-water flight approaches and departures - Move waypoints away from schools, homes, elder residences, and affordable-housing developments—working loosely with representatives on the Massport Community Advisory Committee, city officials, and advocate groups to choose more suitable locations - Eliminate NEPA loopholes enabling environmental assessments to falsely find "no significant impact" from RNAV flight paths; - Work with the Joint Commission on Public Health and public health departments to investigate the health impacts of RNAV related noise and particulate pollution - Require significant changes in the Massport noise-complaint system to eliminate its burdens and bias Finally, I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Current Logan Airport noise abatement procedures include higher shoreline crossings, noise abatement turns and late night runway preferences to reduce flights over densely populated areas and increase over the water flights when possible. The Area Navigation (RNAV) Study is based on a Memorandum of Understanding (MOU) between FAA and Massport committing both organizations to look for opportunities to reduce impacts stemming from FAA's NextGen modernization for the air space system. This is a unique, innovative program with technical work being performed by MIT as independent experts. The study began in 2017 and continues with ideas to increase over the water procedures and reducing flight concentration. Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Medford, on a regular basis and continues to work on looking for measures to reduce overflight noise.
14-2	Maryann Aberg Logan Aircraft Noise Working Group	Forecasts, Noise	It's time for Massport to abandon its efforts to increase capacity at Logan Airport and focus on moving its operations far from the coast and residents of a major metropolitan area.	Massport continues to be a strong advocate with the FAA, aviation industry groups, aircraft manufacturers and airlines towards the continuing reduction of aircraft noise and emissions and where possible to assign the newest, cleanest and quietest aircraft to Logan Airport operations. As a result, in 2019, 98 percent of Logan commercial operations were operated by Stage 4 aircraft, and 15 percent were in Stage 5 aircraft. Massport has in place an extensive noise and air emissions mitigation program that benefits all communities but especially nearby communities including Winthrop. This includes time/location limits on engine runups, late night runway use preference, single engine taxiing, gate plug-in technology, runway use limitations, soundproofing to eligible residents, aircraft towing requirements, noise abatement turns. Massport continues to work with FAA, research institutions like MIT and the MCAC to look for ways to reduce impacts and expand research including on UFP. Finally, Massport has invested over $100M in Worcester airport to introduce and increase commercial air service and focused Hanscom on Corporate GA. This has reduced dependence on Logan Airport and increased regional spread of aviation demand.

Comment #	Author	Topic	Comment	Response
15-1	Michael Adamian, Medford, MA	RNAV, Noise, Air Quality, Flight Paths	Massport must spread out these flights equitably over greater Boston as they were before the narrow RNAV flight corridors were established and not just over "sacrificial zones ".	The Area Navigation (RNAV) Study is based on a Memorandum of Understanding (MOU) between FAA and Massport committing both organizations to look for opportunities to reduce impacts stemming from FAA's NextGen modernization for the air space system. This is a unique, innovative program with technical work being performed by MIT as independent experts. The study began in 2017 and continues with ideas to increase over the water procedures and reducing flight concentration. Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Medford, on a regular basis and continues to work on looking for measures to reduce overflight noise.
15-2	Michael Adamian, Medford, MA	Noise, Air Quality, Flight Paths	Also these constant flights over us during the night must end between the hrs. of 10pm to 7am so residents can sleep!	Comment noted
15-3	Michael Adamian, Medford, MA	Noise, Air Quality, Emissions, Environmental	In addition Massport must addition Massport must limit its growth; it is destroying the health of our area with its increasing noise and air pollution.	Comment noted.
16-1	Dorothy Ahle-Malden, MA	Forecasts (airport growth and projections)	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
17-1	Gillian Anderson-East Boston, MA	Forecasts (airport growth and projections)	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.

Comment #	Author	Topic	Comment	Response
18-1	Lisa Avery, Medford, MA	RNAV, Noise, Traffic, Air Pollution, Flight Path	Massport must change its harmful and equitable policies: - Disperse flights equitably to create paths over all or most Boston area neighborhoods—not just a few narrow corridors—and make that policy the central focus of Professor John Hansman's MIT Noise Study recommendations - Mandate higher altitudes over residential areas at all times - Eliminate noise over residential areas between 10 pm and 7 and by requiring over-water flight approaches and departures - Move waypoints away from schools, homes, elder residences, and affordable-housing developments—working loosely with representatives on the Massport Community Advisory Committee, city officials, and advocate groups to choose more suitable locations - Eliminate NEPA loopholes enabling environmental assessments to falsely find "no significant impact" from RNAV flight paths; - Work with the Joint Commission on Public Health and public health departments to investigate the health impacts of RNAV related noise and particulate pollution - Require significant changes in the Massport noise-complaint system to eliminate its burdens and bias Finally, I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Current Logan Airport noise abatement procedures include higher shoreline crossings, noise abatement turns and late night runway preferences to reduce flights over densely populated areas and increase over the water flights when possible. The Area Navigation (RNAV) Study is based on a Memorandum of Understanding (MOU) between FAA and Massport committing both organizations to look for opportunities to reduce impacts stemming from FAA's NextGen modernization for the air space system. This is a unique, innovative program with technical work being performed by MIT as independent experts. The study began in 2017 and continues with ideas to increase over the water procedures and reducing flight concentration. Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Medford, on a regular basis and continues to work on looking for measures to reduce overflight noise.
18-2	Lisa Avery, Medford, MA	Forecasts	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
19-1	Edward Beuchert-Somerville, MA	Forecasts (airport growth and projections)	I urge you to reject Massport's 2017 ESPR. In addition to that, the ESPR data is old, late and wrong. It's now late 2019 -- what about the last year's 2018 data? The 2017 ESPR predicts 1.1% annual growth in the number of flights, but 2018 figures show a 6% growth over 2017 -- So the projections were obviously completely wrong! I ask that you please reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	As part of the EDR/ESPR process, Massport is required to prepare periodic forecast updates for each ESPR. These updated forecasts allow for the review of local, national and international aviation and economic trends in an effort to provide the most relevant data at the time of document filing. As with all forecast, the are based on best available information and subject to change. Future ESPRs build on those prior experiences and the latest industry information.

Comment #	Author	Topic	Comment	Response
20-1	Julia Burrell- East Boston, MA	Air Quality/ Noise/Forecasts	What will this increasing exposure do to children's developing bodies...especially given the growth projections of Logan Airport in the coming years & the additional pollution associated? With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution. The last ESPR projected 3 million more passengers over 5 years, but 12M more came...It's hard to conceive that our community bears an unmitigated burdened of 9 million unexpected passengers. Massport hasn't managed those extra trips...so, I ask that Massport be held accountable for those additional polluted breaths my community inhaled.	Massport planning forecasts tend to be more optimistic by emphasizing, in the near term, airline plans and, in the long term, economic/industry fundamentals. These forecasts are a snap shot of what is expected in any given time. Depending on actual outcomes, the forecasts may undershoot or overshoot actual activity. For this reason Massport continuously updates forecasts every ESPR and provides yearly updates on actual activity in the EDRs.
20-2	Julia Burrell- East Boston, MA	Forecasts (airport growth and projections)	I implore you to reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses. I ask that you do this on behalf of all East Boston residents, but specifically those most vulnerable...our children.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
21-1	Carla Ceruzzi- East Boston, MA	Environmental/ Forecasts (airport growth and projections)	I attended a public meeting a while back summarizing the contents of the latest ESPR and was shocked to learn that a larger number of additional parking spaces are being contemplated at Logan. It seems that this is completely counter to the idea of encouraging people to get to and from the airport in other ways, and will contribute to the already very challenging traffic. I hope that there will be an opportunity to rethink this.	The Logan Airport Parking Project was advanced with the goal of reducing ground access trips to and from Logan by reducing drop off/pick-up trips for those passengers that could not find adequate on-airport parking. Both MassDEP and EPA agreed with this strategy and approved changes to state and federal regulations to allow an increase of 5,000 parking spaces at Logan Airport. Although all state and federal environmental approvals have been secured, construction is currently on hold. Future EDRs will provide additional updates, as available.
22-1	Phoebe Chadwick-Rivinus 10 Noble Ct Boston, MA 02128	Forecasts, Environmental	As a mother of a young child with asthma, I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.

Comment #	Author	Topic	Comment	Response
23-1	Cindy L. Christiansen, Ph.D., Milton, MA	Forecasts (airport growth and projections)	Massport's prediction for the growth in number of operations is 1.1% per year. In a recent report, the FAA's is 2.04%. That means by 2030, Massport predicts 483,509 operations per year; the FAA says it will be 540,301, a difference of almost 57,000 operations. Which is it? By then, 40% of the approaches will come over Milton, Dorchester, and South Boston, so will we have 97,000 low flying jets/year over the same homes or will it be, as the FAA predicts, 108,000? What we have now is more that we can live with. Where will all of this excessive growth go? Over the residents of MA already unfairly burdened by 35% of all approaches (65,000 now) to Logan and those who reside in Point Shirley who will get the constant departures from Runway 9. Please require a data audit. Someone besides Massport needs to be checking their work.	Massport operations forecasts are based on airline input and local understanding of aircraft types, load factors and expected markets that will be served. As a result, the more precise and informed forecast will differ from other industry forecasts based on more macro-economic and industry wide trends. Over the long run, airlines have been more efficient at accommodating passenger growth at Logan by increasing load factors (the number of passengers per flight) as well as increasing the average size of the aircraft to reduce the number of flights needed for a given number of passengers.
23-2	Cindy L. Christiansen, Ph. D., Milton, MA	Environmental	In summary, this ESPR should not be certified. Please refuse to grant certification to this report.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
24-1	Frank Ciano	Forecasts (airport growth and projections)	I hope you consider this with Massport because no matter what relief, if any , we receive from the MIT study, the continued expansion of Logan will hurt us...	Comment Noted.
24-2	Frank Ciano	Noise	There must be a plan to abate the noise as Massport expands and for Arlington all this was never expected.	Current Logan Airport noise abatement procedures include higher shoreline crossings, noise abatement turns and late night runway preferences to reduce flights over densely populated areas and increase over the water flights when possible. The Area Navigation (RNAV) Study is based on a Memorandum of Understanding (MOU) between FAA and Massport committing both organizations to look for opportunities to reduce impacts stemming from FAA's NextGen modernization for the air space system. This is a unique, innovative program with technical work being performed by MIT as independent experts. The study began in 2017 and continues with ideas to increase over the water procedures and reducing flight concentration. Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Arlington, on a regular basis and continues to work on looking for measures to reduce overflight noise.
25-1	Wendy Corkhum, Winthrop, MA	Forecasts, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic (typically every 5-6 years) ESPR forecasts of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. A benefit of the EDR/ESPR process is that these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue to reduce community impacts from Logan operations.

Comment #	Author	Topic	Comment	Response
26-1	Darcy Deveny-Arlington, MA	Forecasts, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
27-1	Teresa Doyle, Jamaica Plain, MA	Noise, Environmental	I am worried about the impact this has on my family's sleep. I am worried about air pollution over my home and the neighborhood schools.	Comment noted.
27-2	Teresa Doyle, Jamaica Plain, MA	Noise	I have been contacting my elected officials for years. I have been logging weekly complaints with Massport since 2018. I have seen no results whatsoever. I have reported my experience to the FAA who suggest this is an issue for Massport.	Comment noted.
28-1	Danielle Emond	Forecasts, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
29-1	Lindsay Falewicz, East Boston MA	Forecasts	Requesting Massport to historically report their estimates to actual growth would be a great way to see how their estimates are severely miscalculated and hold them accountable for addressing these underestimates.	Chapter 2, *Airport Activity* of the *2017 ESPR* presented an overview of current and past Logan forecasts. The annual EDRs present current operating conditions and updates to the forecasts where relevant. These discussions compare the forecasts to actual passenger and aircraft operations.
29-2	Lindsay Falewicz, East Boston MA	Air Quality/Noise/Emissions/Environmental	Holding Massport accountable to the health ramifications of air and noise pollution is a critical component of their presence in our community	A key purpose of the annual EDR/ESPR filings is to track the operational and environmental impacts of Logan Airport activity. In addition to analyzing emissions and noise levels, the documents describe Massport, FAA and tenant measures to reduce those impact including a range of noise and emission strategies. The periodic ESPR forecasts of potential future noise and emissions levels help to identify key environmental concerns and inform evolving mitigation strategies. The EDRs/ESPRs also provide updates on the latest research and federal initiatives related to noise and air emissions and efforts to understand impacts and reduce levels.
29-3	Lindsay Falewicz, East Boston MA	Forecasts, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.

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30-1	Vanessa Fazio	Forecasts, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
31-1	Barbara Franklin	Environmental/ Forecasts (airport growth and projections)	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic (typically every 5-6 years) ESPR forecasts of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. A benefit of the EDR/ESPR process is that these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue to reduce community impacts from Logan operations.
32-1	Carol Goss	Air Quality/ Noise	This is such an unfair burden on one neighborhood. I can literally sit outside and count the planes as they fly over my house...one by one. One coming when I can still hear the roar of the last one!!	Comment noted.
33-1	Anita Gryan, Arlington, MA	Forecasts, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
34-1	Gary Gryan- Arlington, MA	Forecasts, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
35-1	Aileen Healy, Medford, MA	Flight Path/Noise	Enforce higher altitudes over suburban areas, And STOP all residential noise between 11PM and 7AM	Aircraft flight paths are defined by a combination of FAA airspace and safety standards and aircraft performance characteristics. Particularly in areas close to airports, arrival and departure altitudes are designed to provide safe operations. In general, departure routes aim to have aircraft safely achieve flight altitudes as quickly as possible. Similarly, arrival and departure routes favor areas where population density is lower where possible and safe.

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35-2	Aileen Healy, Medford, MA	Environmental Impact/Air Quality	Request a valid evaluation of the environmental impact on air quality an human health	Massport produces annual environmental reports in the form of EDRs/ESPRs. These reports quantify airport noise and air emissions. The EDR/ESPRs also present relevant available information on the health effects of aviation. Chapter 7, *Air Quality/Emissions Reduction* provides updated information regarding recent and ongoing scientific studies associated with airport emissions.
36-1	Kathleen Higgins Shea, Medford, MA	Sea Level Rise	Given the inevitability of this future, it's time for Massport to abandon its efforts to increase capacity at Logan Airport and focus on moving its operations far from coast and residents of major Metropolitan area.	Comment noted. Massport will continue work to protect Logan Airport from climate change and sea level rise.
36-2	Kathleen Higgins Shea, Medford, MA	RNAV	Massport has an ethical responsibility to: Massport has an ethical responsibility to: Disperse flights equitably by creating paths over all or most Boston area neighborhoods, not just a few narrow corridors, and make that policy the central focus of Professor John Hansman's MIT Noise Study recommendations; Mandate higher altitudes over residential areas at all times; Eliminate noise over residential areas between 10 pm and 7 am by requiring over-water flight approaches and departures; Move waypoints away from schools, homes, elder residences, and affordable-housing developments—working closely with representatives on the Massport Community Advisory Committee, city officials, and advocate groups to choose more suitable locations; Eliminate NEPA loopholes enabling environmental assessments to falsely find "no significant impact" from RNAV flight paths; Work with the Joint Commission on Public Health and public health departments to investigate the health impacts of RNAV-related noise and particulate pollution; and Require significant changes in the Massport noise-complaint system to eliminate its burdens and bias.	Current Logan Airport noise abatement procedures include higher shoreline crossings, noise abatement turns and late night runway preferences to reduce flights over densely populated areas and increase over the water flights when possible. The Area Navigation (RNAV) Study is based on a Memorandum of Understanding (MOU) between FAA and Massport committing both organizations to look for opportunities to reduce impacts stemming from FAA's NextGen modernization for the air space system. This is a unique, innovative program with technical work being performed by MIT as independent experts. The study began in 2017 and continues with ideas to increase over the water procedures and reducing flight concentration. Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Medford, on a regular basis and continues to work on looking for measures to reduce overflight noise.
37-1	Martha Karchere	Forecasts	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.

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38-1	Robert Kuhn, Arlington, MA	Air Quality, Noise	I write to request that the EEA not certify Massport's 2017 ESPR.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
38-2	Robert Kuhn, Arlington, MA	Noise	Either the #22 monitor is faulty or has been improperly tuned in such a fashion as to ignore about 50% of the plane noise events. And that's just one monitor and one runway. What about the rest of the noise from Logan? Clearly, the model needs adjustment to match more accurate collected data, rather than the other way around, in order to reflect the full reality of Logan's environmental impact.	Massport's network of monitors around Logan Airport are calibrated regularly and meet industry standards for accuracy. The monitors provide data on actual readings and must adjust for non aviation noise such as local traffic for example. FAA requires airports to use modeling for environmental and reporting purposes and deems modeling more accurate than actual measurements. Massport utilizes FAA model with actual Logan Airport inputs including flight track data, weather, aircraft types, etc.
38-3	Robert Kuhn, Arlington, MA	Forecasts, Mitigation	I ask that you please reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
39-1	Ursula Kullmann, Medford, MA	Forecasts, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
40-1	Richard Madden,	Air Quality, Noise	I write to advise you of my opposition to ESPR2017EEA3247.	Comment noted.

Comment #	Author	Topic	Comment	Response
41-1	David Matheu, Arlington, MA	Noise	I specifically urge you to reject Massport's ESPR for the following reasons: Unbounded, Recruited Growth Overwhelmed All "Mitigation" Activity It is your responsibility to reject Massport's claim to have "mitigated" their impacts. ESPR Continues to Massively Underpredict Future Logan Operations - and Impact. Please do not accept the ESPR until Massport can account for why, in every situation where they must do this, they massively underpredict passenger load and growth for Logan. Demand that Massport use real predictions vetted by an outside authority. Please prevent Massport from deceiving the public this way. Massport Refers Problems to MCAC, Which Has Little Power over Massport. Massport continues to stall, delay, or simply ignore the requests and recommendations that MCAC produces. This must stop. At a minimum, you must reject ESPF|. until this behavior changes. Massport must allow MCAC real authority. as representatives of the host communities. It must be accountable for schedules try which it will answer requests, take actions, and fix problems - like any real public authority.	Current Logan Airport noise abatement procedures include higher shoreline crossings, noise abatement turns and late night runway preferences to reduce flights over densely populated areas and increase over the water flights when possible. The Area Navigation (RNAV) Study is based on a Memorandum of Understanding (MOU) between FAA and Massport committing both organizations to look for opportunities to reduce impacts stemming from FAA's NextGen modernization for the air space system. This is a unique, innovative program with technical work being performed by MIT as independent experts. The study began in 2017 and continues with ideas to increase over the water procedures and reducing flight concentration. Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Arlington, on a regular basis and continues to work on looking for measures to reduce overflight noise.
41-2	David Matheu, Arlington, MA	Noise/Air Quality	ESPR Modeling is Inaccurate, Allowing Significant Underreporting of Impacts. This is one monitor and one runway (33L). The model needs to be adjusted to match real noise monitor data-without Massport interfering or controlling the monitors to skip or ignore overflights. There is other evidence of deception in its use of noise data, models, and maps. In one instance, 123 "N70" events were recorded in a 15 hour period in West Medford - which is outside the 20-event contour of Massport's N70 map. How is it possible that the contour map so greatly understates the actual noise impacts? Massport must be forced to turn over noise monitoring, and noise modeling, to a disinterested third party that does not directly benefit from increased operations. Until they do, you must reject any ESPR from this entity. Massport Ignores The Health Consequences of Concentrated Noise Pollution. Massport ignores Skyrocketing Noise Complaints Since 2013 there has been a massive upsurge in noise complaints to Massport - 10's of thousands more per year. The ESPR essentially ignores this. Any accountable public agency would never be allowed to ignore so dramatic an increase in pollution complaints from individual citizens. Why is Massport allowed to get away with this in its ESPR? Massport Is Externalizing the Negative Consequences of Flying, onto its hosts	The Area Navigation (RNAV) Study is based on a Memorandum of Understanding (MOU) between FAA and Massport committing both organizations to look for opportunities to reduce impacts stemming from FAA's NextGen modernization for the air space system. This is a unique, innovative program with technical work being performed by MIT as independent experts. The study began in 2017 and continues with ideas to increase over the water procedures and reducing flight concentration. Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Arlington, on a regular basis and continues to work on looking for measures to reduce overflight noise. Massport supports ongoing research sponsored by FAA and academic institutions to better understand of air emissions and other sources over communities. The EDRs/ESPRs provide updates on these efforts.
41-3	David Matheu, Arlington, MA	Reporting	ESPR Impact Reporting is Deceptive in Other Ways. Massport states ... that flight operations in 2017 are lower than the peak year of 1998.	This statement is accurate as reported.

Comment #	Author	Topic	Comment	Response
41-4	David Matheu, Arlington, MA	Noise	Massport ignores the health consequences of Concentrated Noise Pollution.	Massport continues to be a strong advocate with the FAA, aviation industry groups, aircraft manufacturers and airlines towards the continuing reduction of aircraft noise and where possible to assign the newest, cleanest and quietest aircraft to Logan Airport operations. As a result, in 2019, 98 percent of Logan commercial operations were operated by Stage 4 aircraft, and 15 percent were in Stage 5 aircraft. Massport has in place an extensive noise mitigation program that benefits all communities but especially nearby communities including Winthrop. This includes time/location limits on engine runups, late night runway use preference, single engine taxiing, gate plug-in technology, runway use limitations, soundproofing to eligible residents, aircraft towing requirements, noise abatement turns. Massport continues to work with FAA, research institutions like MIT and the MCAC to look for ways to reduce impacts and expand research.
42-1	Anastacia Marx de Salcedo-Cambridge, MA	Flight Path/ Emissions	I hereby request that the Massachusetts Environmental Protection Agency require that Massport provide detailed information for Public health research on concentrated Flight paths and gaseous and particulate emissions exposure data/estimates for concentrated flight paths. For each of the health impacts listed below, please provide a detailed bibliography of studies done under concentrated flight paths and synopsis of findings, including whether the effect was found to be related to exposure to noise, gaseous emissions, particulates, and/or ultrafine particulates. If for a potential public health impact, no research has been done for its prevalence and severity in areas under concentrated flight paths, but has been done for those living in proximity to a runway, please provide these as a substitute, noting that there is as of-yet no specific research on the topic.	The FAA is currently leading a series of nationwide studies on the operational and environmental impacts of RNAV procedures that have lead to a concentration of flights in many areas. On a parallel track, there are numerous ongoing national and international scientific studies evaluating the impacts of air transport, including ultrafine particulates. Chapter 7, *Air Quality/Emissions Reduction* of this *2018/2019 EDR* provides updates on a number of these topics. Massport will continue to meet or exceed federal regulatory emission guidelines.
42-2	Anastacia Marx de Salcedo-Cambridge, MA	Air Quality/ Noise	Can Massport calculate for a single aircraft (with the intent of estimating an approximately total exposure over time) an exposure range of various pollutants at 1, 2 and 3 nautical miles from the flight path or track and at 2000 and 3000 feet altitude for the following (and any other known aviation-related pollutants that may have been inadvertently omitted from this list)? Gaseous and Particulate Pollutants Under Concentrated Flight Paths, Known Pollutants (Regulated), Noise (please provide all DNL values above zero (0) as well as any alternative noise metrics available) Carbon monoxide Hydrocarbons Nitrogen oxides Ozone Particulates Emerging Pollutants (Unregulated) Ultrafine particulates (smaller than 100 nm)	Chapter 6, *Noise Abatement* presents noise contours in 5 dB intervals above 60 DNL. 65 DNL represents FAA's federal threshold for noise impacts. The contours, population within those contours and a range of supplemental metrics presented in this chapter aims to provide an understanding of Logan Airport's impacts beyond FAA's standard annualized contours. Chapter 7, *Air Quality/Emission Reductions* presents information on the regulated criteria pollutants, associated analyses and discussions of evolving studies. As noted, federal regulatory criteria associated with ultrafine particulate matter are not yet available. Future EDRs/ESPRs would incorporate such analyses when new regulations are adopted.

Comment #	Author	Topic	Comment	Response
43-1	Cathy McNeil-Milton, MA	Environmental/ Forecasts (airport growth and projections)	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic (typically every 5-6 years) ESPR forecasts of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. A benefit of the EDR/ESPR process is that these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue to reduce community impacts from Logan operations.
44-1	Meredith McSorley Cambridgeport, MA	Air Traffic, Noise	I am submitting a comment here regarding air traffic noise. I own a condo in Cambridge port near Chroma and air traffic noise has increased significantly since I moved in 4 years ago.	Comment noted.
45-1	Ryan Miller, East Boston, MA	Forecast, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
46-1	Sheila Mooney Belmont, MA Massachusetts	Forecast, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
47-1	Rosalind Mott,	Forecast, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.

Comment #	Author	Topic	Comment	Response
48-1	Fabricio Paes, East Boston, MA	Forecast, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
49-1	Gaby Perry, East Boston, MA	Forecast, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
50-1	Jessica Petriello	RNAV	Please provide a list of the names, street address and municipality) of all of senior housing (nursing homes, assisted living, rehabilitation and other similar housing) whose location puts them under all current RNAV flight paths. Please also provide the number of residents at these facilities broken out by facility name, street address, and municipality, as well as total number of residents overall. Please list the locations (street address and municipality) of all of low-income housing (public, Section 8, and other similar housing) that are under all current RNAV flight paths. Please also provide the number of residents to broken out by building name (or other), street address, and municipality, as well as total number of residents overall.	The Area Navigation (RNAV) Study is based on a Memorandum of Understanding (MOU) between FAA and Massport committing both organizations to look for opportunities to reduce impacts stemming from FAA's NextGen modernization for the air space system. This is a unique, innovative program with technical work being performed by MIT as independent experts. The study began in 2017 and continues with ideas to increase over the water procedures and reducing flight concentration. Massport has been receiving input from the public and the MCAC (representing over 30 communities around Logan Airport) on a regular basis and continues to work on looking for measures to reduce overflight noise. Any final environmental review process the FAA will conduct will include a review consistent with the National Environmental Policy Act and its requirements.
51-1	Thomas Phipps,	Forecast, Mitigation	I am writing to ask you not to accept Massport's report EEA#3247.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
51-2	Thomas Phipps	Flight Paths, Air Quality, Noise	Please do something to help the thousands of people who are adversely affected by this unfair system.	Comment noted.

Comment #	Author	Topic	Comment	Response
52-1	Kathleen Rourke	Noise, Traffic, Air Pollution	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
52-2	Kathleen Rourke	Forecasts	Why is Logan Airport allowed to expand operations and increase air travel given the amount of research studies showing the impact of air travel on greenhouse gasses and global warming?	Prior to the COVID-19 pandemic, Logan Airport operations have grown over the past few decades. Despite this growth in passenger levels, Logan Airport's aircraft operations remain well below the highs experienced in the late 1990s. As a result, the long-range trend for noise and air emissions shows a dramatic decrease from that time. Chapter 6, Noise and Chapter 7, Air Quality show those changes over time. On a parallel track, Massport has made significant progress in reducing emissions with high-efficiency buildings, low/non-emitting vehicles, growing use of renewable energy sources and effective HOV strategies aimed at reducing ground access trips.
53-1	Bill Schmidt - Winthrop, MA	Emissions/Air Quality	Massport should take a leading effort in our nation to advocate for new planes with significantly lower emissions. Massport needs to increase the mitigation efforts towards Winthrop and other surrounding communities that are so greatly impacted by airport operations, planned expansion activities at Logan Airport, and passenger transportation to and from the airport. If Massport wants to be a good neighbor, it needs to provide more to its neighbors given the tremendous adverse impact it has on people's lives.	Massport continues to be a strong advocate with the FAA, aviation industry groups, aircraft manufacturers and airlines towards the continuing reduction of aircraft noise and emissions and where possible to assign the newest, cleanest and quietest aircraft to Logan Airport operations. As a result, in 2019,100 percent of Logan commercial operations were operated by Stage 4 and or Stage 5 aircraft. Massport has in place an extensive noise and air emissions mitigation program that benefits all communities but especially nearby communities including Winthrop. This includes time/location limits on engine runups, late night runway use preference, single engine taxiing, gate plug-in technology, runway use limitations, soundproofing to eligible residents, aircraft towing requirements, and noise abatement turns. Massport continues to work with FAA, research institutions like MIT and the MCAC to look for ways to reduce impacts and expand research including on UFP.
53-2	Bill Schmidt-Winthrop, MA	Noise	Massport needs to work with the airlines on noise-reducing measures and commit to further expenditures for insulation of affected homes in the community.	Massport had recent success with Logan Airport's largest carrier jetBlue Airways in encouraging them to install Vortex Generators on their Airbus A320 family aircraft to reduce noise. This is an example of Massport's continuing advocacy to reduce aircraft noise and emissions.
54-1	Noel Scott, Medford, MA	Flight Paths, Noise	I am writing to complain about air traffic over traffic; Specifically: 1. The rapid escalation in air traffic volume. 2. The noise created by air traffic. 3. The way point directly over the middle school. 4. The low flight patterns.	Comment Noted.

Comment #	Author	Topic	Comment	Response
55-1	Claire Silvers, Cambridge, MA	Forecast, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
56-1	Danielle Simbajon, Medford, MA	Environmental	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
57-1	DeNee Skipper, Belmont, MA	Forecasts (airport growth and projections)	I truly hope Logan will not continue to grow and grow, without a care for those of us who live nearby.	Comment noted
58-1	Nat Taylor	Forecast, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
59-1	Kannan Thiruvengadam, East Boston, MA	Forecast, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.

Comment #	Author	Topic	Comment	Response
60-1	Mary Tittmann, Cambridge MA	RNAV	I believe the only recourse, besides requiring noise mitigation for aircraft, which I am sure the airlines will fight vociferously, is to disperse flights rather than relying on the RNAV system.	The Area Navigation (RNAV) Study is based on a Memorandum of Understanding (MOU) between FAA and Massport committing both organizations to look for opportunities to reduce impacts stemming from FAA's NextGen modernization for the air space system. This is a unique, innovative program with technical work being performed by MIT as independent experts. The study began in 2017 and continues with ideas to increase over the water procedures and reducing flight concentration. Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Cambridge, on a regular basis and continues to work on looking for measures to reduce overflight noise. Massport supports ongoing research sponsored by FAA and academic institutions to better understand of air emissions and other sources over communities. The EDRs/ESPRs provide updates on these efforts.
60-2	Mary Tittmann, Cambridge MA	Forecast, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
61-1	Nancy S. Timmerman, P.E., Boston, MA	Air Quality, Noise	NMS Sites 3 and 4 should be very well modeled, since they are directly under the flight paths. In recent years, there has been a discrepancy. The differences between the threshold and modeled levels were also computed. In these cases, the threshold is larger than the modeled level. This is also true for some communities farther out, including Milton, Lynn, Everett, Jamaica Plain, and Mattapan	Massport's current noise monitoring system and location of microphones have been set to capture the overall noise exposure around Logan over all runway ends and in a broad geographic area. The EDRs/ESPRs utilize FAA approved modeling to capture more detail on noise exposure around Logan. Massport provides specific noise infraction based on this modeling result- please refer to Appendix H, *Noise Abatement* .
61-2	Nancy S. Timmerman, P.E., Boston, MA	Noise	Your Noise Monitoring System should be able to provide to a complainant the level measured at the nearest site at the time of the complaint.	Massport's current noise monitoring system and location of microphones have been set to capture the overall noise exposure around Logan over all runway ends and in a broad geographic area. The EDR/ESPR utilizes FAA approved modeling to capture more detail on noise exposure around Logan. Massport provides specific noise information based on this modeling result- please refer to Appendix H, *Noise Abatement* .
62-1	Karla Torres-Welch	Forecast, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.

Comment #	Author	Topic	Comment	Response
63-1	Bill Trabilcy-Belmont, MA	Forecast, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.
64-1	Andrea van Wien-Medford, MA	Flight Path/ Noise	Given the inevitability of this future, it's time for Massport to abandon its efforts to increase capacity at Logan Airport and focus on moving its operations far from the coast and residents of a major metropolitan area. Disperse flights equitably by creating paths over all or most Boston area neighborhoods, not just a few narrow corridors, and make that policy the central focus of Professor John Hansman's MIT Noise Study recommendations; Mandate higher altitudes over residential areas at all times; Eliminate noise over residential areas between 10 pm and 7 am by requiring over-water flight approaches and departures; Move waypoints away from schools, homes, elder residences, and affordable-housing developments—working closely with representatives on the Massport Community Advisory Committee, city officials, and advocate groups to choose more suitable locations; Eliminate NEPA loopholes enabling environmental assessments to falsely find "no significant impact" from RNAV flight paths; Work with the Joint Commission on Public Health and public health departments to investigate the health impacts of RNAV-related noise and particulate pollution; and Require significant changes in the Massport noise-complaint system to eliminate its burdens and bias.	The Area Navigation (RNAV) Study is based on a Memorandum of Understanding (MOU) between FAA and Massport committing both organizations to look for opportunities to reduce impacts stemming from FAA's NextGen modernization for the air space system. This is a unique, innovative program with technical work being performed by MIT as independent experts. The study began in 2017 and continues with ideas to increase over the water procedures and reducing flight concentration. Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Medford, on a regular basis and continues to work on looking for measures to reduce overflight noise. Massport supports ongoing research sponsored by FAA and academic institutions to better understand of air emissions and other sources over communities. The EDRs/ESPRs provide updates on these efforts.
64-2	Andrea van Wien-Medford, MA	Forecast, Mitigation	I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.

Comment #	Author	Topic	Comment	Response
65-1	Maureen Wing, Medford, MA	RNAV, Noise, Air Quality, Community Engagement	We demand that Massport and the FAA remedy this situation by the following: Disperse flights equitably by creating paths over all or most Boston area neighborhoods, not just a few narrow corridors, and make that policy the central focus of Professor John Hansman's MIT Noise Study recommendations; Mandate higher altitudes over residential areas at all times; Eliminate noise over residential areas between 10 pm and 7 am by requiring over-water flight approaches and departures; Move waypoints away from Schools, homes, elder residences, and affordable-housing developments—working closely with representatives on the Massport Community Advisory Committee, city officials, and advocate groups to choose more suitable locations; Eliminate NEPA loopholes enabling environmental assessments to falsely find "no significant impact" from RNAV flight paths; Work with the Joint Commission on Public Health and public health departments to investigate the health impacts of RNAV-related noise and particulate pollution; and Require significant changes in the Massport noise-complaint system to eliminate its burdens and bias. (for example, eliminate "canned", condescending written responses from Massport)	Current Logan Airport's noise abatement procedures include higher shoreline crossings, noise abatement turns and late night runway preferences to reduce flights over densely populated areas and increase over the water flights when possible. The Area Navigation (RNAV) Study is based on a Memorandum of Understanding (MOU) between FAA and Massport committing both organizations to look for opportunities to reduce impacts stemming from FAA's NextGen modernization for the air space system. This is a unique, innovative program with technical work being performed by MIT as independent experts. The study began in 2017 and continues with ideas to increase over the water procedures and reducing flight concentration. Massport has been receiving input from the public and the Massport Community Advisory Committee (MCAC), which includes representatives from Medford, on a regular basis and continues to work on looking for measures to reduce overflight noise. Massport supports ongoing research sponsored by FAA and academic institutions to better understand of air emissions and other sources over communities. The EDRs/ESPRs provide updates on these efforts.
66-1	Alan Wright, Roslindale, MA	Environmental	Massport must do more to address man-made climate change. I call upon Ms. Wieland and the Massport Board of Directors to bring Massport into the 21st Century existential fight to preserve the climate that has made civilization possible. She should enlist the Massachusetts Congressional delegation to work to revise the FAA regulations that currently prevent Massachusetts citizens – who own the Massport facilities – from using our resources to protect our environment. Accordingly, Massport should stop adding new terminal and runway capacity at all of its air facilities and stop recruiting an increase in travelers with its airline partners	As described throughout this *2018/2019 EDR*, Massport has a wide range of programs aimed at reducing the impact of Logan operations on our neighboring communities. Overall airfield "capacity" is a function of the number, length, and orientation of Logan's runways. No new runways have been constructed since 2006 and ongoing terminal upgrades/improvements are aimed at operating efficiencies and not passenger growth. As was the case with the ongoing Terminal E Modernization, when it was built in 1974, Terminal E served 1.4 million passengers. In 2015 (during project permitting), it served 5.5 million passengers and that growth continued through early 2020. As of the date of this document, Massport has initiated construction of the first 4 gates and the second phase of the project has been deferred.
66-2	Alan Wright, Roslindale, MA	Air Quality / Emissions	Massport, in partnership with state and federal elected officials and transportation organizations, should explore ways to reduce incentives for the public to fly and actively work to enhance other less polluting means of transportation. The next Massport ESPR should be based on a radical revision of goals for the Massport facilities – goals that reflect the true external costs of fossil fueled based transportation	Massport continues to work closely with state and federal transportation agencies on all forms of transportation. Massport is evolving it's vehicle fleet to low or non-emitting technologies and we work to make it easier for our tenants and users to reduce their emissions. It is interesting to note that Amtrak now carries more passengers between New York and Boston than does air transportation - this is a significant change over the past few decades. Chapter 4, *Regional Transportation* provides more information on regional transportation trends. Updates on Massport's emission reduction strategies and programs are discussed through this *2018/2019 EDR*.

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Form Letter

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From:
To: Canaday, Anne (EEA)
Subject: Opposition to ESPR 2017
Date: Tuesday, October 22, 2019 4:31:24 PM

The Honorable Kathleen A. Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Attn: Anne Canaday, EEA 3247
100 Cambridge Street, Suite 900
Boston, Massachusetts 02114
Re: Boston Logan International Airport 2017 Environmental Status and Planning Report - EEA #3247

Dear Secretary Theoharides,

I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution.

ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region.

Form Letter

I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.

Sincerely,

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Form Letter Signatures	
Audrina Warren	Charles Cambria
Sara Goldsmith	Ali Reed
Jim Linthwaithe	Nick Camacho
Susan M. Horn	Jenn Cunio
Jodi Remington	Michelle McCann
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Paul K. Ciampa	Christy Tatarian
Colleen Murphy	Anthony Leonardi
Nancy Hurley-Clafin	Damien Margardo
Tom Clafin	Mary Ryan
Fbw823@yahoo.com	Gail Miller
Robin Maguire	Kristen D’Avolio
Steven Tamasy	Suzanne and Scott
Rebecca Lynds	Bobbie Ross
John Casamassima	Mikki De Sisto Falcone
Kathryn Skogstrom	Rick Sherva
Lisa DeAngelico	Michael Mullen
Rebecca Gorlin	Kelly O’Keefe
Julie Rizzo	Mary O’Connor
Andrew Desantis	Kevin Donahue
Nikolas Navakos	Karen Gaeta
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Catherine Sullivan	Nick Laconte
Colleen Murphy	Deborah Lalone
Gina Cassetta	Elaine Sullivan
Dominic Rizzotto	James Roberts
Kim Brazier	Albee Schimanski
Sara Swart	Bill Curtis
Anne Griepenburg	Isabelle Tocci
Barbara Franklin	William Tanner
Jeanne Stewart	Lisa Jacobson
Maura Garrity	Magdalena Ayed
Luz-Dary Barlow	Jenn Goonan
Shannon Viera	Patricia Dunn
Roberta W. Benton	Judith Gundersen

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Mary Gail Murphy	Donna Swanson
Kevin Slattery	Trudy Marsolini
Brian Ferrari	Liz O'Rourke
Ian Chiang	Linda Nelson
Heather McKinnon Glennon	Stacie and Brian Marley
Mary Palermo	Carole Brown
Tracey Honan	Scott Gagnon
Rebecca Connell	Hagar Shirman
Eivin Hila	Christopher Pearl
Theodore Resnikoff	Wendy Corkhum
Jaclyln Loson	Jane Moncreiff
Jennifer Harris	Roberta W. Benton
Kathy Masterson	Kim Brazier
Nancy Morelli	David Brazier
Bill Masterson	Martin Shannon
Zachary Heath	Zachary Speert
Liddy Cole	Layne Petrie
Nicole Bishop	Suzanne Knight
Mariellen Dalton	Maria Drewnowski
Josephine Fatta	Scott Oakley Hersey
Josephine Matthews	Paul Skogstrom
Julia Collins	Jonathan Hess
Cheryl Granara	Christopher Marci
Ariana Lehrer	Amy Tai
Jake Bernier	Baljinder Nijjar
Carole Brown	Jonvante Nijjar
Aleksandra Kuzina	Jasmine Nijjar
Roberta W. Benton	Sandra Nijjar
Dominique Bonafoux	arytych@voyager.net
Robert Fiore	Julia Wallerce
Marie Piacenza	Alyssa Vangeli
Dawn Sullivan	Sonja Tengblad
Frederico Leal	Anne Riesenfeld
Joan Dimarzo	Sarah Paysnick
Vincent Crossman	Meredith Krebs-Smith
Tracey Honan	Charles Blandy
Catherine McNeil	Johanna Brook
Beth Battson	Allison Donelan
Charles Bartoloni	Andrea LeBlanc
Anita Albright	Daryl Warner
Brian Crosse	Ellen Daly
Amy King	Kevin Donahue
Peter Dunn	

Comment #	Author	Topic	Comment	Response
Form Letter	Form Letter *	Forecast, Mitigation	I am writing to express my opposition to ESPR 2017 EEA 3247. With future impact projections based on unreasonably low passenger growth forecasts, this ESPR will lead to huge increases in unmitigated noise, traffic, and air pollution. ESPR 2017 forecasts that Logan will reach the 50 million annual passenger level within the next 10 - 15 years. This rate of growth implies an increase of 3.8M passengers by the release of the next ESPR, in 2024. However, at current growth rates, 14M passengers will come, leaving our region to deal with the impacts of 10M passengers above and beyond the scope of this ESPR's policy and mitigation strategies. This failure of ESPR 2017 to provide accurate planning forecasts follows similar failings in ESPR 2011 which have caused crippling traffic congestion and expanded unhealthy noise and pollution throughout the metropolitan region. I ask that you reject Massport's request for certification of ESPR 2017 and call upon them to produce a Supplemental ESPR which provides realistic forecasts and effective policy and mitigation responses.	Massport has been preparing annual filings describing Logan Airport operating and environmental conditions since the early 1980s. Throughout that period, in addition to the annual status reports (EDRs), Massport produces periodic ESPR forecasts (typically every 5-6 years) of projected passenger levels, aircraft operations, ground access trips, noise and emission impacts. As with all forecasts, they are based on best available information at the time and subject to change. As a benefit of the EDR/ESPR process, these forecasts must be regularly updated to reflect new information and combined with the environmental projections, help Massport develop strategies to continue minimizing impacts associated with Logan Airport operations on surrounding communities.

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C

Proposed Scope for the 2020 EDR

PROJECT NAME: Logan Airport 2020 Environmental Data Report (EDR)

PROJECT LOCATION: Boston Logan International Airport, East Boston, Massachusetts

EEA NUMBER: 3247

PROPONENT: Massachusetts Port Authority (Massport)

Massport respectfully submits this proposed scope for the Logan Airport *2020 Environmental Data Report* (EDR) for public review and comment. The *2020 EDR* would follow the combined *2018/2019 EDR*, which was filed in December 2020. As directed by the Secretary of the Executive Office of Energy and Environmental Affairs (EEA), Massport will continue to use this process to evaluate the cumulative impacts associated with Logan Airport activities through preparation of an Environmental Status and Planning Report (ESPR) approximately every five years with data updates annually through the EDRs. The next ESPR will provide updated passenger and operations forecasts for Boston Logan International Airport (Logan Airport or the Airport), taking the pandemic effects into account. Massport will continue to post the full EDR/ESPR documents on the Massport website (http://massport.com/massport/about-massport/project-environmental-filings/). In addition to the standard report materials, the *2020 EDR* will provide a more focused status on the impact of the COVID-19 pandemic on Logan Airport in particular and the aviation industry at large. As described in the *2018/2019 EDR*, the COVID-19 pandemic has had a significant impact on Logan Airport operations and environmental impacts; the *2020 EDR* will provide additional details on the status of the recovery and outline expectations based on available information.

Purpose of the Logan Airport *2020 EDR*

For nearly four decades, the Logan Airport EDRs and ESPRs (and the former Generic Environmental Impact Report [GEIR]/Annual Updates) have provided information to agencies and the public on planning activities, aircraft operations and passenger activity levels, and Massport initiatives at Logan Airport. The *2020 EDR* will provide an update on conditions at Logan Airport for calendar year 2020, reflecting the effects of the pandemic. The EDR will continue to serve as a background/context against which projects at Logan Airport can be evaluated. It also will report on the cumulative effects of Logan Airport operations and activities, compared to previous years, as appropriate.

The EDR/ESPR process was developed to allow individual projects at Logan Airport to be considered and analyzed in the broader, Airport-wide context. The EDRs and ESPRs serve as the baseline analyses for project-specific environmental reviews and provide a forum for updates on Massport's mitigation program. The

2020 EDR is part of a well-established, state-level environmental review process that assesses Logan Airport's cumulative environmental impacts. The process provides a context against which individual projects at Logan Airport meeting state and federal environmental review thresholds are evaluated on a project-specific basis. The Airport-wide and project-specific environmental review processes are described in this report. Where appropriate, Massport will continue to identify and address any longer-term aviation and environmental trends in both EDRs and ESPRs.

As in previous years, the EDR/ESPR will continue to be the forum to address cumulative, Airport-wide impacts. By providing the Airport-wide context for air quality, noise, ground transportation, and water quality, the EDRs/ESPRs help focus the review processes for state Environmental Notification Forms (ENFs) and, if necessary, Environmental Impacts Reports (EIRs). In this manner, Massport ensures that segmented project review does not occur in the context of Massachusetts Environmental Policy Act (MEPA) review of projects at Logan Airport. The EDRs/ESPRs also provide context for federal National Environmental Policy Act (NEPA) reviews by the Federal Aviation Administration (FAA) serving as the lead federal agency. In short, the EDRs/ESPRs provide a planning context which complements the individual project-specific filings.

Contents of the *2020 EDR*

The *2020 EDR* will follow the format of the *2018/2019 EDR*, first presenting an overview of the role of Logan Airport in the regional planning context. This will be followed by a status report on Massport's proposed planning initiatives, projects, and mitigation. In this way, Massport will provide necessary background information to allow the reviewer to understand the environmental policies and planning which form the context of the environmental reporting, technical studies, and environmental mitigation initiatives at Logan Airport.

The technical studies in the *2020 EDR* will include reporting on and analysis of key indicators of airport activity levels, the regional transportation system, ground access, noise, air quality, water quality and environmental management, and project mitigation tracking. Sustainability initiatives will be included throughout the document. Each chapter's contents are described below.

Chapter 1. Introduction/Executive Summary

This chapter of the *2020 EDR* will include:

- Airport status within the context of the continuing COVID-19 pandemic
- Highlights of 2020 planning and environmental conditions;
- Overview of Logan Airport and its environmental, geographic, and regulatory context;
- Overview of the EDR/ESPR cycle;
- Highlights of passenger activity levels and aircraft operations;
- Overview of the regional intermodal transportation system;

- Description of the analysis framework for the environmental reporting and technical studies to be conducted;
- Overview of the Logan Airport planning initiatives and projects;
- Overview of sustainability initiatives at Logan Airport; and
- Organization of the *2020 EDR*.

A Spanish version of the Executive Summary for the *2020 EDR* will be prepared and included in the document.

Chapter 2. Activity Levels

This chapter will report on airport activity levels for 2020, including:

- Domestic and international passenger activity levels;
- Aircraft operations, including fleet mix and scheduled airline services at Logan Airport;
- Cargo and mail volumes;
- Comparison of 2020 aircraft operations, cargo/mail operations, and passenger activity levels to 2019 activity levels; and
- Report on national aviation trends in 2020 and the effect of the pandemic.

Chapter 3. Airport Planning

Massport continues to assess planning strategies for improving Logan Airport's operations and services in a safe, secure, more efficient, and environmentally sensitive manner. As owner and operator of Logan Airport, Massport also must accommodate and guide tenant development. This chapter will describe the status of planning initiatives for the following areas:

- Ground Transportation and Parking Planning;
- Terminal Area Planning;
- Airside Planning;
- Service Area Planning;
- Airport Buffers and Open Space Planning; and
- Energy, Sustainability, and Resiliency Planning.

The chapter will provide Massport's best estimate, as of the *2020 EDR* filing, regarding the status of projects and the anticipated short- and long-term implementation timeframe. Adjustments associated with the pandemic will be documented.

Chapter 4. Regional Transportation

The *2020 EDR* will describe Logan Airport's role in the region's intermodal transportation system by reporting on the following:

Regional Airports

- Regional airport operations, and passenger activity levels;
- Status of major plans or initiatives as provided by the regional airport entities; and
- The role that Worcester Regional Airport and Hanscom Field play in the regional aviation system and Massport's role in managing regional aviation facilities.

Regional Intermodal Transportation System

- Massport's cooperation with other transportation agencies to promote efficient regional highway and transit operations; and
- Report on metropolitan and regional rail initiatives and ridership.

Chapter 5. Ground Access to and from Logan Airport

The chapter will report on 2020 conditions, changes in ground access activities, updates in traffic modeling, and provide a comparison to 2019 conditions for the following:

- High occupancy vehicle (HOV) ridership (including Blue Line, Silver Line, scheduled, unscheduled, water transportation, and Logan Express);
- Logan Airport gateway volumes;
- On-Airport traffic volumes/vehicle miles traveled (VMT);
- Parking demand and management (including rates and duration statistics);
- Logan Airport Parking Freeze;
- Trends of RideApp companies, such as Uber and Lyft, and their operations at Logan Airport;
Logan Airport Employee Transportation Management Association (Logan TMA) services;
- Status of proposed ground access planning, anticipated Massachusetts Bay Transportation Authority (MBTA) ridership, and possible changes in HOV mode share;
- Status of long-range ground access management strategy planning; and
- Effect of the pandemic on landside operations and parking.

The chapter will also report on HOV strategies, long-term parking management program, the status of the ongoing RideApp activities, and the status of efforts to reduce single occupancy vehicle trips to the airport and improving management of ground access and infrastructure through technology.

Chapter 6. Noise Abatement

This chapter will provide an overview of noise metrics and the environmental regulatory framework affecting aircraft noise, the changes in aircraft noise, and the updates in noise modeling. Massport will use the FAA's Aviation Environmental Design Tool (AEDT) to model 2020 noise conditions. The chapter will report on 2020 conditions and compare those conditions to those of 2019 for the following:

- Noise modeling inputs such as fleet mix, various aircraft Stage classifications, daily and nighttime operations, runway use, flight tracks, and meteorological data.
- Noise levels including annual modeled noise contours and noise-impacted population;
- Measured versus modeled noise values, including reasons for differences and any improvements attributable to the models deployed; and
- Supplemental metrics including: Cumulative Noise Index (CNI), Times-Above for 65, 75, and 85 A-weighted decibel (dBA) threshold values, and dwell and persistence analysis.

The chapter will report on noise abatement efforts including the status of the Residential Sound Insulation Program (RSIP), flight track monitoring and noise complaint tracking, web-based flight tracking system, and aircraft fleet improvements. The chapter will also report on the ongoing area navigation (RNAV) Pilot Project, which is anaylzing the feasibility of changes to some of RNAV approaches and departures from Logan Airport. A summary of studies Massport is supporting through the Aviation Sustainability Center (ASCENT), and other entities, as well as international research efforts will be reported.

Chapter 7. Air Quality/Emissions Reductions

This chapter will begin with an overview of the environmental regulatory framework affecting aircraft emissions, the National Ambient Air Quality Standards (NAAQS), and the Massachusetts State Implementation Plan (SIP). The FAA's AEDT model and Environmental Protection Agency (EPA) required motor vehicle emissions modeling tool (MOtor Vehicle Emission Simulator [MOVES]) will continue to be used to assess aircraft-related emissions and vehicular emissions on airport roadways. The chapter will include:

- Sources of emissions including aircraft, ground service equipment, motor vehicles, and stationary sources.
- Emissions inventories for carbon monoxide (CO), oxides of nitrogen (NO_x), volatile organic compounds (VOCs), and particulate matter (PM).
- Status or ultrafine particle studies

- Reporting on Massport's voluntary inventory of greenhouse gas (GHG) emissions from Logan Airport in 2020. GHG emissions will be quantified for aircraft, ground service equipment (GSE), motor vehicles, and stationary sources using emission factors and methodologies outlined in EEA's *Greenhouse Gas Emissions Policy and Protocol*, and the Transportation Research Board's *Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories*[1]. In addition, Massport will report on GHG emissions per passenger, building energy use intensity, and building GHG emissions.

The chapter will also report on Massport's air emissions reduction strategy including updates on Massport's and tenant's alternative fuel vehicle programs; minimizing emissions from motor vehicles and aircraft, and an update on Massport's efforts to encourage the use of single engine taxiing under safe conditions. The *2020 EDR* will report on the research and regulatory status of ultrafine particles (UFPs) and black carbon and on the status of Logan Airport air quality studies undertaken by Massport or others, as available. The chapter will provide discussion on progress on the national and international efforts to decrease air emissions. The chapter will conclude with a summary of progress on Massport's climate change adaptation and resiliency initiatives.

Chapter 8. Environmental Compliance and Management/Water Quality

This chapter will report Massport's approach to environmental management and compliance through monitoring and documentation. Reporting for 2020 will include:

- National Pollutant Discharge Elimination System (NPDES) Permit and monitoring results for Logan Airport's outfalls and the Fire Training Facility;
- Jet fuel usage and spills;
- Massachusetts Contingency Plan (MCP) activities;
- Tank management program;
- Update on the environmental management plan; and
- Fuel spill prevention.

The chapter will also report on Massport's water quality improvement strategies including the Logan Airport Environmental Management System (EMS), tenant technical assistance, the stormwater pollution prevention plan, and spill prevention control and countermeasure plans.

1 Airport Cooperative Research Program (ACRP) Report 11, Project 02-06.

Chapter 9. Project Mitigation Tracking

This chapter will report on the status of mitigation commitments for specific Massport and tenant projects at Logan Airport that have undergone MEPA review and other commitments and have commenced construction. The status of mitigation commitments made in the Section 61 Findings for the following projects will be reported:

- West Garage/Central Garage (EOEA 9790);
- International Gateway (EOEA 9791);
- Logan Airside Improvements Planning Project (EOEA 10458);
- Terminal A Replacement Project (EOEA 12096);
- Southwest Service Area Redevelopment Program/Rental Car Center (EOEA 14137);
- Logan Runway Safety Area Improvements Project (EOEA 14442); and
- Terminal E Modernization Project (EEA 15434).

This chapter will update the status of Massport's projects with Section 61 mitigation commitments and will also identify projects for which mitigation is complete.

Appendices

MEPA Documentation

These appendices will include a copy of the Secretary's Certificate and comment letters received on the *2018/2019 EDR*. Individual responses to items raised in the Secretary's Certificate on the *2017 ESPR* and comments in reviewers' letters will be provided. The document will also contain copies of MEPA Certificates or documentation issued for projects at Logan Airport that refer to the EDR/ESPR documentation.

A distribution list for the *2020 EDR* (indicating those receiving printed documents or Notices of Availability with links to the online version of the EDR) will be provided. Massport will also provide printed copies to community libraries.

Supporting Technical Documentation

Supporting technical appendices will be provided as necessary.

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D

Distribution

This *2018/2019 Environmental Data Report (EDR)* has been distributed to federal, state, and city agencies and to parties listed in this appendix. The list includes those entities that the Massachusetts Environmental Policy Act (MEPA) requires as part of the review of the document, representatives of governmental agencies, commenters on the *2017 Environmental Status and Planning Report (ESPR)*, and community groups concerned with Airport activities. **The 'N' indicates that Massport sent a Notice of Availability and the 'P' indicates that Massport sent a printed copy.** MEPA distribution requirements are currently modified due to COVID-19.

The *2018/2019 EDR* is also available on Massport's website at www.massport.com. Limited printed copies of the *2018/2019 EDR* may be requested from Brad Washburn, Massport, Logan Office Center, One Harborside Drive, Suite 200S, East Boston, MA 02128, telephone (617) 568-3546, email: bwashburn@massport.com. Printed copies of this report are available for review at the following public libraries:

	Library	Address		Library	Address
P	Boston Public Library Attn. Anna, Fahey-Flynn Main Branch	700 Boylston Street Boston, MA 02116	N	Boston Public Library Brighton Branch	40 Academy Hill Road Brighton, MA 02135
N	Boston Public Library Charlestown Branch	179 Main St Charlestown, MA 02129	N	Boston Public Library Chinatown Branch	2 Boylston Street Boston, MA 02116
P	Boston Public Library Connolly Branch	433 Centre Street Jamaica Plain, MA 02130	P	Boston Public Library Dorchester Branch	690 Adams Street Dorchester, MA 02122
P	Boston Public Library East Boston Branch	365 Bremen Street East Boston, MA 02128	N	Boston Public Library Egleston Square Branch	2044 Columbus Ave Boston, MA 02119
P	Boston Public Library Fields Corner Branch	1520 Dorchester Ave Dorchester, MA 02122	N	Boston Public Library Grove Hall Branch	41 Geneva Ave Boston MA 02121
N	Boston Public Library Honan-Allston Branch	300 N. Harvard Street Allston, MA 02134	N	Boston Public Library Hyde Park Branch	35 Harvard Ave Hyde Park, MA 02136
N	Boston Public Library Jamaica Plain Branch	20 South Street Jamaica Plain, MA 02130	N	Boston Public Library Jamaica Plain/ Codman Square Branch	690 Washington Street Boston, MA 02124
N	Boston Public Library Lower Mills Branch	27 Richmond Street Boston, MA 02124	P	Boston Public Library Mattapan Branch	1350 Blue Hill Avenue Boston, MA 02126
N	Boston Public Library North End Branch	25 Parmenter Street Boston, MA 02113	N	Boston Public Library Parker Hill Branch	1497 Tremont Street Crossing, MA 02120

Library		Address	Library		Address
N	Boston Public Library Roslindale Branch	4246 Washington Street Roslindale, 02131	P	Boston Public Library Roxbury Branch	149 Dudley Street Roxbury, MA 02119
P	Boston Public Library South Boston Branch	646 East Broadway South Boston, MA 02127	N	Boston Public Library South End Branch	685 Tremont St Boston, MA 02118
P	Boston Public Library Uphams Corner Branch	500 Columbia Road Dorchester, MA 02125	N	Boston Public Library West End Branch	151 Cambridge Street Boston, MA 02114
P	Bedford Public Library	7 Mudge Way Bedford, MA 01730	P	Cambridge Main Library	449 Broadway Cambridge, MA 02138
P	Cary Memorial Library	1874 Massachusetts Ave. Lexington, MA 02420	P	Chelsea Public Library	569 Broadway Chelsea, MA 02150
P	Concord Public Library	129 Main Street Concord, MA 01742	P	Everett Public Library Parlin Memorial Library	410 Broadway Everett, MA 02149
P	Lincoln Public Library	3 Bedford Road Lincoln, MA 01773	N	Malden Public Library	36 Salem Street Malden, MA 02148
P	Medford Public Library	200 Boston Avenue Suite G-350 Medford, MA 02155	P	Milton Public Library Main Branch	476 Canton Avenue Milton, MA 02186
P	Quincy Public Library Thomas Crane Branch	40 Washington Street Quincy, MA 02169	P	Revere Public Library	179 Beach Street Revere, MA 02151
N	Robbins Library (Arlington Public Library)	700 Massachusetts Ave Arlington, MA 02476	P	Somerville Public Library	79 Highland Avenue Somerville, MA 02143
P	State Transportation Library	10 Park Plaza, Suite 4160 Boston, MA 02116	P	Winthrop Public Library	2 Metcalf Square Winthrop, MA 02151

Federal Government		
■ **United States Senators and Representatives**		
P The Honorable Lori Trahan Attn: Emily Byrne U.S. House of Representatives 126 John Street, Suite 12 Lowell, MA 01852	P The Honorable Ayanna Pressley Attn: Erina Colombo U.S. House of Representatives 1700 Dorchester Avenue Boston, MA 02122	P The Honorable Katherine Clark Attn: Wade Blackman U.S. House of Representatives 157 Pleasant Street, Suite 4 Malden, MA 02148
P The Honorable Richard E. Neal U.S. House of Representatives 300 State Street, Suite 200 Springfield MA, 01105	P The Honorable Seth Moulton Attn: Rick Jakious U.S. House of Representatives 21 Front Street Salem, MA 01970	P The Honorable William R. Keating Attn: Mike Jackman U.S. House of Representatives 50 Resnik Road, Suite 103 Plymouth, MA 02360
P The Honorable Jake Auchincloss U.S. House of Representatives P.O. Box 600698 Newtonville, MA 02460	P The Honorable Stephen F. Lynch Attn: Shynah Barnes U.S. House of Representatives One Harbor Street, Suite 304 Boston, MA 02210	P The Honorable James P. McGovern Attn: Kelly Brissett U.S. House of Representatives 12 East Worcester Street, Suite 1 Worcester, MA 01604
P The Honorable Elizabeth Warren Attn: Darrien Johnson 2400 JFK Federal Building 15 New Sudbury Street Boston, MA 02203	P The Honorable Edward J. Markey Attn: Rory Clark 975 JFK Federal Building 15 New Sudbury Street Boston, MA 02203	
■ **Environmental Protection Agency**		
P Amanda Brylski Office of Environmental Stewardship U.S. Environmental Protection Agency – Region 1 5 Post Office Square – Suite 100 Boston, MA 02109	P Chief of Operations U.S. Environmental Protection Agency – Region 1 5 Post Office Square – Suite 100 Mail Code OEP 06-5 Boston, MA 02109	P Dennis Deziel Regional Administrator U.S. Environmental Protection Agency – Region 1 5 Post Office Square – Suite 100 Mail Code 01-4 Boston, MA 02109
■ **Federal Aviation Administration**		
P Colleen D'Alessandro, Acting New England Regional Administrator Department of Transportation FAA - New England Region 1200 District Avenue Burlington, MA 01803	P Brian Brunelle Tower Manager Department of Transportation Federal Aviation Administration Logan International Airport 600 Control Tower, 19th Floor East Boston, MA 02128	P Gail Lattrell Department of Transportation FAA - New England Region Airports Division 1200 District Avenue Burlington, MA 01803
P Lisa Lesperance Department of Transportation FAA - New England Region, Airports Division 1200 District Avenue Burlington, MA 01803	P Richard Doucette Manager, Environmental Programs Department of Transportation FAA - New England Region, Airports Division 1200 District Avenue Burlington, MA 01803	

Federal Government *(Continued)*

- **United States Army Corps of Engineers**

P Colonel John A. Atilano II
Commander and District Engineer
U.S. Army Corps of Engineers
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- **United States Fish and Wildlife Service**

P Wendi Weber
Northeast Regional Director
U.S. Fish and Wildlife Service
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P NE Field Office
U.S. Fish and Wildlife Service
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State Government

- **Senate/House of Representatives**

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Massachusetts State House
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P Representative Adrian Madaro
Vice Chair, Joint Committee on Transportation
Massachusetts State House,
24 Beacon Street, Room 134
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P Senator Sal DiDomenico
Massachusetts State House
24 Beacon Street, Room 405
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P Senator Joseph Boncore
Chair, Joint Committee on Transportation
Massachusetts State House
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P Representative Robert DeLeo
Speaker of the House
Massachusetts State House
24 Beacon Street, Room 356
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P Representative Jessica Giannino
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P Representative Daniel Ryan
Massachusetts State House,
24 Beacon Street, Room 36
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P Representative William Straus
Chair, Joint Committee on Transportation
Massachusetts State House
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P Senator Nick Collins
Massachusetts State House
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P Senator Eric Lesser
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P Representative David Biele
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- **Executive Office of Energy and Environmental Affairs**

P Secretary Kathleen Theoharides
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State Government *(Continued)*

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N Christine Kirby Director, Air and Climate Division Department of Environmental Protection One Winter Street, 9th Floor Boston, MA 02108	N Jerome Grafe Water Resources, MassDEP Northeast Regional Office One Winter Street, 10th Floor Boston, MA 02108	

■ **Department of Public Health**		
N Monica Bharel, MD, MPH Commissioner, Department of Public Health Department of Public Health 250 Washington Street Boston, MA 02108	N Environmental Analyst Bureau of Environmental Health 250 Washington Street, 7th Floor Boston, MA 02108	

■ **Department of Conservation and Recreation**		
N Commissioner Jim Montgomery Department of Conservation and Recreation 251 Causeway Street, Suite 600 Boston, MA 02114		

■ **Metropolitan Area Planning Council**		
N Marc Draisen, Executive Director Metropolitan Area Planning Council 60 Temple Place, 6th Floor Boston, MA 02111	N Eric Bourassa, Transportation Director 60 Temple Place, 6th Floor Boston, MA 02111	

■ **Department of Fisheries, Wildlife and Environmental Law Enforcement**	■ **Department of Housing and Community Development**	■ **Coastal Zone Management**
N Environmental Reviewer Mass Wildlife Field Headquarters 1 Rabbit Hill Road Westborough, MA 01581	N Jennifer Maddox, Undersecretary Department of Housing and Community Development 100 Cambridge Street #300 Boston, MA 02114	N Lisa Berry Engler, Director Office of Coastal Zone Management 251 Causeway Street, Suite 800 Boston, MA 02114

■ **Central Transportation Planning Staff**		
N Scott Peterson Interim Co-Executive Director Central Transportation Planning Staff 10 Park Plaza, Room 2150 Boston, MA 02116	N Annette Demchur Interim Co-Executive Director Central Transportation Planning Staff 10 Park Plaza, Room 2150 Boston, MA 02116	

State Government *(Continued)*

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N Katie Ronan
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N Jonathan Gulliver
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N David Panagore, Chief Administrative Officer, MBTA
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■ **Massachusetts Historical Commission**

N William Francis Galvin
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■ **Massachusetts Executive Office of Health and Human Services**

N Secretary Marylou Sudders,
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■ **Massachusetts Department of Public Safety**

N Secretary Thomas Turco
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■ **Natural Heritage and Endangered Species Program**

N Lauren Glorioso, Endangered Species Review Biologist
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N Patricia Jacobs Massport Board of Directors Massachusetts Port Authority One Harborside Drive East Boston, MA 02128	N John Nucci Massport Board of Directors Massachusetts Port Authority One Harborside Drive East Boston, MA 02128	N Sean M. O'Brien Massport Board of Directors Massachusetts Port Authority One Harborside Drive East Boston, MA 02128
N Warren Fields Massport Board of Directors Massachusetts Port Authority One Harborside Drive East Boston, MA 02128		
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Office of the Mayor	**Boston Transportation Department**	
P Martin J. Walsh, Mayor City of Boston One City Hall Square Boston, MA 02201	P Gregory Rooney, Acting Commissioner Boston Transportation Department One City Hall Square, Room 721 Boston, MA 02201	P Robert D'Amico, City Planner Boston Transportation Department One City Hall Square, Room 721 Boston, MA 02201
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P Brian Golden Director, Boston Planning & Development Agency One City Hall Square, 9th floor Boston, MA 02201	P Aisha Miller Chief of Civic Engagement One City Hall Square, Room 805 Boston, MA 02201	N Lina Tramelli Neighborhood Liaison, East Boston City of Boston One City Hall Square, Room 805 Boston, MA 02201
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P Ryan Woods, Commissioner Parks and Recreation Department 1010 Massachusetts Avenue, 3rd Floor Boston, MA 02118	P Maureen Feeney City Clerk One City Hall Square, Room 601 Boston, MA 02201	P Rita Nieves, RN, MPH, LICSW Interim Executive Director Boston Public Health Commission 1010 Massachusetts Avenue, 6th Floor Boston, MA 02118

Municipalities, City of Boston *(Continued)*		
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N Christopher Cook Chief of Environment, Energy, and Open Space 1010 Mass Ave, 3rd Floor Boston, MA 02118		
■ **Boston Environment Department**		
P Carl Spector, Commissioner Environment Department One City Hall Square, Room 709 Boston, MA 02201	P Alison Brizius, Director of Climate and Environmental Planning Environment Department One City Hall Square, Room 709 Boston, MA 02201	P Maura Zlody Environment Department One City Hall Square, Room 709 Boston, MA 02201
■ **Boston Water and Sewer Commission**		
N John Sullivan, Chief Engineer Boston Water and Sewer Commission 980 Harrison Avenue Boston, MA 02119	N Adam Horst, Project Director Boston Water and Sewer Commission 980 Harrison Avenue Boston, MA 02119	N Charlie Jewell, Director of Planning Boston Water and Sewer Commission 980 Harrison Avenue Boston, MA 02119
■ **Boston City Council**		
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N Annissa Essaibi George Councilor-At-Large One City Hall Square, Suite 550 Boston, MA 02201	N Lydia Edwards, Councilor, District 1 Attn. Gabriela Coletta One City Hall Square, Suite 550 Boston, MA 02201	N Ed Flynn, Councilor, District 2 One City Hall Square, Suite 550 Boston, MA 02201
N Frank Baker, Councilor, District 3 One City Hall Square, Suite 550 Boston, MA 02201	N Andrea Campbell, Councilor, District 4 One City Hall Square, Suite 550 Boston, MA 02201	N Ricardo Arroyo, Councilor, District 5 One City Hall Square, Suite 550 Boston, MA 02201
N Matt O'Malley, Councilor, District 6 One City Hall Square, Suite 550 Boston, MA 02201	N Kim Janey, Council President, District 7 One City Hall Square, Suite 550 Boston, MA 02201	N Kenzie Bok, Councilor, District 8 One City Hall Square, Suite 550 Boston, MA 02201
N Liz Breadon, Councilor, District 9 One City Hall Square, Suite 550 Boston, MA 02201		
■ **Town of Milton**		
N Milton Board of Selectmen Town Office Building 525 Canton Avenue Milton, MA 02186	N Michael Dennehy Town Administrator Town Office Building 525 Canton Avenue Milton, MA 02186	

Municipalities *(Continued)*		
■ City of Chelsea		
N Thomas G. Ambrosino, City Manager, Chelsea City Hall 500 Broadway Chelsea, MA 02150	N Jeannette Cintron White, City Clerk Chelsea City Hall 500 Broadway Chelsea, MA 02150	N Roy Avellaneda, Councilor-At-Large Chelsea City Hall 500 Broadway Chelsea, MA 02150
N Stephen Sarikas Chelsea Conservation Commission Chelsea City Hall 500 Broadway Chelsea, MA 02150	N Luis Prado, MSPIH, Director Board of Health & Human Services Chelsea City hall 500 Broadway Chelsea, MA 02150	N John DePriest Director of Planning & Development City of Chelsea 500 Broadway, Room 101 Chelsea, MA 02150
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N Charles J. Phelan, Jr., Councilor Ward 5, Quincy City Council 298 Fenno Street Quincy, MA 02170	N Brian Palmucci, Councilor Ward 4 Quincy City Council 1305 Hancock Street Quincy, MA 02169	
■ City of Revere		
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■ Town of Winthrop		
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N Philip Boncore, Esq. Council President Winthrop Town Hall One Metcalf Square Winthrop, MA 02152	N James Letterie Vice President, Precinct 2 Winthrop Town Hall One Metcalf Square Winthrop, MA 02152	N Tracy Honan Councilor-At-Large Winthrop Town Hall One Metcalf Square Winthrop, MA 02152
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N Barbara Flockhart Councilor, Precinct 4 Winthrop Town Hall One Metcalf Square Winthrop, MA 02152	N Peter Christopher Councilor, Precinct 5 Winthrop Town Hall One Metcalf Square Winthrop, MA 02152	N Stephen Ruggiero Councilor, Precinct 6 Winthrop Town Hall One Metcalf Square Winthrop, MA 02152

Municipalities, Town of Winthrop *(Continued)*		
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N Bill Schmidt Chair, Winthrop Board of Health One Metcalf Square Winthrop, MA 02152	P Gina Cassetta Air Pollution, Noise, and Airport Hazards Committee One Metcalf Square Winthrop, MA 02152	
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N Leo Robinson Councilor At-Large, Chelsea City Council 83 Warren Avenue Chelsea, MA 02150		
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N Susan Morong 33 Bournedale Rd Jamaica Plain, MA 02130		
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Community Groups and Interested Parties		
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Technical Appendices

- Appendix E, Activity Levels
- Appendix F, Regional Transportation
- Appendix G, Ground Access to and from Logan Airport
- Appendix H, Noise Abatement
- Appendix I, Air Quality/Emissions Reduction
- Appendix J, Environmental Compliance and Management/Water Quality
- Appendix K, Peak Period Pricing Monitoring Reports
- Appendix L, Reduced/Single Engine Taxiing at Logan Airport Memoranda

E

Activity Levels

This appendix provides detailed tables in support of Chapter 2, *Activity Levels*:

Table E-1 Logan Airport Historical Air Passenger and Operations Data

Year	Operations	Air Passengers	Year	Operations	Air Passengers
1980	258,167	14,722,363	2001	463,125	24,474,930
1981	251,961	14,827,684	2002	392,079	22,696,141
1982	244,468	15,867,722	2003	373,304	22,791,169
1983	288,956	17,848,797	2004	405,258	26,142,516
1984	318,959	19,417,971	2005	409,066	27,087,905
1985	349,518	20,448,424	2006	406,119	27,725,443
1986	363,995	21,862,718	2007	399,537	28,102,455
1987	414,968	23,369,002	2008	371,604	26,102,651
1988	407,479	23,732,959	2009	345,306	25,512,086
1989	388,797	22,272,860	2010	352,643	27,428,962
1990	424,568	22,878,191	2011	368,987	28,907,938
1991	430,403	21,450,143	2012	354,869	29,235,643
1992	474,378	22,723,138	2013	361,339	30,218,631
1993	493,093	23,579,726	2014	363,797	31,634,445
1994	458,623	24,468,178	2015	372,930	33,449,580
1995	466,327	24,192,095	2016	391,222	36,288,042
1996	456,226	25,134,826	2017	401,371	38,412,419
1997	482,542	25,567,888	2018	424,024	40,941,925
1998	507,449	26,526,708	2019	427,176	42,522,411
1999	494,816	27,052,078			
2000	487,996	27,726,833			

Source: Massport and U.S. Department of Transportation, T-100 Database

Table E-2 Logan Airport Changes in Domestic Passenger Operations by Carrier

Airline	2000	2005	2010	2013	2014	2015	2016	2017	2018	2019	2018-2019 Change	2018-2019 % Change
Scheduled Jet Carriers	**233,993**	**190,991**	**203,052**	**211,176**	**214,854**	**225,629**	**235,381**	**242,404**	**257,626**	**257,103**	**-523**	**-0.2%**
AirTran Airlines	3,090	14,580	13,672									
Alaska Airlines[1]		1,088	1,733	2,661	3,090	3,027	3,256	3,351	6,474	5,920	-554	-8.6%
America West Airlines	5,116	4,467										
American Airlines[2]	30,821	27,712	21,313	22,535	58,222	56,623	55,249	50,766	54,055	50,150	-3,905	-7.2%
American Trans Air	1,448	2,294										
Continental Airlines	16,894	13,546	10,869									
Delta Air Lines[3]	52,954	36,388	28,980	21,139	23,614	30,705	30,476	32,050	35,040	37,496	2,456	7.0%
Frontier Airlines	1,052		1,094					2		1,211	1,211	
Hawaiian Airlines										425	425	
Independence Air		4,676										
JetBlue		15,069	49,981	73,374	76,247	79,364	84,590	93,485	99,929	104,571	4,642	4.6%
Midway Airlines	4,096											
Midwest Airlines	3,726	3,570	1,961									
Northwest Airlines	13,147	9,685										
People Express					170							
Southwest Airlines[4]			13,727	23,701	21,967	21,542	24,436	24,129	23,191	19,907	-3,284	-14.2%
Spirit Airlines			3,023	2,721	2,945	4,896	7,245	8,853	10,269	9,838	-431	-4.2%
Sun Country Airlines	723		313	926	1,027	1,414	1,374	1,391	1,030	288	-742	-72.0%
Trans World Airlines	6,280											
United Airlines[5]	28,092	18,304	16,314	25,214	24,374	24,632	25,031	24,623	27,638	27,297	-341	-1.2%
US Airways[6]	66,554	39,612	36,678	35,613								
Virgin America			3,394	3,292	3,198	3,426	3,724	3,754				
Regional/Commuter Carriers	**160,041**	**137,203**	**94,535**	**79,922**	**76,682**	**70,274**	**68,204**	**68,753**	**74,766**	**79,736**	**4,970**	**6.6%**
America West Express	1,267											
American Eagle	62,140	37,394	15,291	4	5	52	6,418	7,046	5,302	3,731	-1,572	-29.6%
Boutique Air									1,229	1,881	652	53.1%
Cape Air	31,026	25,018	35,899	37,194	35,080	35,994	35,993	33,235	35,523	35,358	-165	-0.5%
Continental Connection			1,809									
Continental Express		12,544	529									
Delta Connection	15,438	26,557	18,445	20,848	20,265	15,466	18,586	22,231	29,045	37,835	8,790	30.3%
MidAtlantic Express												
Midwest/Republic			258									
Northwest Airlink		5,034										
PenAir				4,384	4,382	3,747	3,662	3,438	1,229		-1,229	
Republic Airlines				58	53	34						
Silver Airways									261	416	155	59.4%
United Express		3,178	2,802	5,829	5,628	4,699	3,545	2,803	2,177	516	-1,661	-76.3%
US Airways Express	50,170	27,478	19,502	11,605	11,269	10,282						
Non-Scheduled Operations (Incl. Charter)	**1,008**	**325**	**501**	**200**	**164**	**176**	**158**	**176**	**199**	**109**	**-90**	**-45.2%**
Total Domestic Operations	**395,042**	**328,519**	**298,117**	**291,298**	**291,700**	**296,079**	**303,743**	**311,333**	**332,591**	**336,948**	**4,357**	**1.3%**

Source: Massport

Notes: Excludes general aviation and all-cargo operations.

1 Alaska Airlines includes Virgin America beginning in 2018 (following 2016 acquisition).

2 American Airlines includes US Airways beginning in 2014 (following 2013 merger).

3 Delta Air Lines totals include Northwest Airlines beginning in 2009 (following 2008 merger).

4 Southwest Airlines include AirTran Airways beginning 2012 (following 2011 merger).

5 United Airlines totals include Continental Airlines beginning in 2011 (following 2010 merger).

6 US Airways totals in this chart include America West Airlines beginning in 2006 (following 2005 merger).

Table E-3 Logan Airport Changes in International Passenger Operations by Carrier

Airline	2000	2005	2010	2013	2014	2015	2016	2017	2018	2019	2018-2019 Change	2018-2019 %Change
Scheduled Jet Carriers	**27,427**	**24,550**	**20,771**	**23,301**	**25,065**	**28,225**	**34,752**	**37,522**	**35,551**	**39,284**	**3,733**	**10.5%**
Aer Lingus	1,160	1,016	1,097	1,513	1,933	1,973	2,066	2,011	1,995	1,860	-135	-6.8%
Aeromexico		534				345	580	624	657	16	-641	-97.6%
Air Berlin							192	278				
Air Canada	10,047	5,782	3,895	1,747	1,084	1,686	2,729	3,982	1,111	1,932	821	73.9%
Air Europa								72	2		-2	
Air France	1,046	1,334	995	955	899	910	900	884	828	856	28	3.4%
Air Jamaica		349										
Air One												
Alitalia	729	986	624	542	550	562	558	548	544	550	6	1.1%
American Airlines[1]	4,657	4,672	2,422	447	344	571	533	530	198	183	-15	-7.6%
Astraeus												
Avianca								226	501	218	-283	-56.5%
British Airways	2,159	2,151	2,082	2,573	2,678	2,575	2,702	2,522	2,685	2,650	-35	-1.3%
Canadian Airlines	417											
Cathay Pacific						279	454	652	703	699	-4	-0.6%
Copa Airlines				347	730	646	638	730	1,100	966	-134	-12.2%
Delta Air Lines[2]	733	749	1,675	2,851	3,008	3,122	3,459	3,871	4,034	4,722	688	17.1%
El Al						152	296	298	288	296	8	2.8%
Emirates					600	914	1,382	1,034	734	719	-15	-2.0%
Eurowings							72					
Finnair		44										
FlyGlobespan												
Hainan Airlines					280	744	961	1,032	1,078	1,056	-22	-2.0%
Iberia Airlines			435	404	332	336	412	464	707	859	152	21.5%
Icelandair	726	811	816	1,120	1,227	1,287	1,338	1,265	1,041	1,044	3	0.3%
Japan Airlines				646	731	728	736	730	732	728	-4	-0.5%
JetBlue			2,262	6,138	6,348	6,488	7,146	7,406	7,628	9,520	1,892	24.8%
KLM Royal Dutch Airlines								2		263	263	
Korean Air Lines	314									367	367	
LACSA Airlines												
LATAM									210	476	266	126.7%
Lufthansa	1,140	1,564	1,657	1,723	1,712	1,687	1,728	1,707	1,662	1,703	41	2.5%
Northwest Airlines	744	727										
Norwegian Air Shuttle						34	656	718	928	1,429	501	54.0%
Olympic Airways	256											
Primera Air									238		-238	
Qatar Airways							552	728	734	730	-4	-0.5%
Royal Air Maroc										161	161	
Sabena	724											
SATA International Airlines		315	403	466	533	542	630	844	780	809	29	3.7%
Scandinavian Airlines							500	536	320	369	49	15.3%
SWISS International	926	704	720	720	722	711	1,020	924	942	978	36	3.8%
TACA		327							156	136	-20	-12.8%
TACV - Cabo Verde		154	240	214	186	60			99	112	13	13.1%

Table E-3 Logan Airport Changes in International Passenger Operations by Carrier (Continued)

Airline	2000	2005	2010	2013	2014	2015	2016	2017	2018	2019	2018-2019 Change	2018-2019 % Change
TAP - Air Portugal	200						378	643	642	644	2	0.3%
Thomas Cook Airlines							62	144	104	2	-102	-98.1%
Trans World Airlines												
Turkish Airlines					452	726	658	616	644	674	30	4.7%
United Airlines	728						21	13	14	21	7	50.0%
US Airways		1,607	667	186								
VG Airlines												
Virgin Atlantic Airways	721	724	707	709	716	702	715	764	778	1,361	583	74.9%
WestJet Airlines									12	4	-8	-66.7%
Wow Air						445	678	724	722	171	-551	-76.3%
Regional/Commuter Carriers	**15,594**	**13,112**	**12,494**	**14,378**	**14,720**	**14,153**	**15,204**	**14,597**	**18,081**	**15,149**	**-2,932**	**-16.2%**
Air Canada Regional	4,088	5,120	7,065	9,563	10,364	10,024	9,051	7,497	10,719	8,910	-1,809	-16.9%
American Eagle Airlines	8,975	4,637	2,480									
Delta Connection	2,531	3,355	81	1,082	56	38	32	63	60	50	-10	-16.7%
Porter Airlines			2,868	3,733	4,300	4,091	3,869	3,899	3,840	3,959	119	3.1%
WestJet Encore							2,252	3,138	3,462	2,230	-1,232	-35.6%
Non-Scheduled Operations	**2,141**	**1,068**	**305**	**277**	**185**	**248**	**63**	**65**	**45**	**43**	**-2**	**-4.4%**

Source: Massport.
Note: Excludes general aviation and all-cargo operations.
1 American Airlines includes US Airways beginning in 2014 (following 2013 merger).
2 Delta Air Lines totals include Northwest Airlines beginning in 2009 (following 2008 merger).

Table E-4 Logan Airport Scheduled Passenger Departures by Destination

Destination Airport	Code	2000	2005	2010	2013	2014	2015	2016	2017	2018	2019	2018-2019 Change	2018-2019 % Change
Domestic		**210,069**	**163,684**	**149,961**	**147,076**	**149,208**	**152,211**	**155,482**	**160,980**	**171,257**	**171,986**	**729**	**0.4%**
New York La Guardia	LGA	11,872	13,350	11,705	9,255	9,056	9,352	9,365	11,080	10,889	10,893	4	0.0%
Washington National	DCA	8,474	10,680	9,419	8,360	8,645	8,678	8,629	8,759	8,511	9,246	734	8.6%
Philadelphia	PHL	11,785	7,014	6,548	7,305	8,092	7,971	5,786	5,298	6,099	7,907	1,808	29.6%
Chicago O'Hare	ORD	10,063	7,412	7,403	7,733	7,822	7,401	7,139	6,825	7,492	7,894	402	5.4%
Atlanta	ATL	7,110	6,003	5,548	5,501	5,454	5,192	5,386	6,656	6,991	6,494	-497	-7.1%
New York Newark	EWR	5,206	5,626	3,666	5,702	5,532	5,366	5,239	5,169	5,571	5,926	355	6.4%
Baltimore	BWI	1,773	5,029	7,053	5,737	5,060	4,897	5,731	5,987	5,888	5,658	-230	-3.9%
New York J F Kennedy	JFK	9,899	4,985	7,054	5,919	6,139	6,745	6,971	6,391	6,363	5,472	-892	-14.0%
Los Angeles	LAX	3,647	2,655	3,382	3,603	4,080	4,456	4,650	4,775	5,739	5,248	-490	-8.5%
San Francisco	SFO	3,526	2,591	3,711	4,038	4,305	4,272	4,551	4,796	5,384	5,075	-309	-5.7%
Raleigh/Durham	RDU	3,775	4,110	3,259	3,313	3,634	3,598	3,718	3,748	3,836	4,433	596	15.5%
Orlando	MCO	4,914	3,517	3,179	3,399	2,883	3,057	3,323	4,234	4,046	4,313	267	6.6%
Charlotte	CLT	2,758	3,288	4,180	3,911	3,916	3,920	3,878	3,835	3,960	4,269	309	7.8%
Nantucket	ACK	5,022	3,452	3,884	3,601	3,567	4,311	4,605	4,378	4,158	4,228	70	1.7%
Detroit	DTW	2,937	2,827	2,353	2,340	3,354	3,875	3,932	3,849	3,784	3,615	-169	-4.5%
Pittsburgh	PIT	3,086	2,021	2,312	2,641	2,678	2,457	2,210	2,729	3,842	3,485	-356	-9.3%
Denver	DEN	2,628	1,990	2,812	2,433	2,446	2,611	2,839	2,812	3,117	3,285	169	5.4%
Minneapolis	MSP	3,078	1,791	1,927	2,200	2,322	2,737	2,865	2,801	3,363	3,230	-133	-4.0%
Dallas/Fort Worth	DFW	5,002	3,544	2,938	4,147	3,705	3,406	3,418	3,231	3,157	3,126	-30	-1.0%
Nashville	BNA	642			588	628	688	1,467	2,058	2,525	3,063	538	21.3%
Fort Lauderdale	FLL	3,327	3,065	2,370	2,379	2,173	2,258	2,634	2,709	3,024	3,047	24	0.8%
Tampa	TPA	2,502	1,946	1,246	1,195	1,182	1,177	1,429	2,106	2,526	2,696	170	6.7%
Martha's Vineyard	MVY	3,863	2,231	3,218	2,740	2,793	2,731	2,929	2,572	2,809	2,596	-213	-7.6%
Richmond	RIC	1,537	1,404	1,431	1,723	2,450	2,603	2,338	2,349	2,305	2,369	64	2.8%
Buffalo	BUF	950	1,226	2,181	2,468	2,433	2,203	2,120	2,249	2,529	2,337	-192	-7.6%
Seattle/Tacoma	SEA	458	610	1,001	1,378	1,607	1,625	1,907	2,051	2,373	2,289	-84	-3.6%
Miami	MIA	2,068	2,072	2,238	2,555	2,551	2,520	2,523	2,519	2,485	2,224	-261	-10.5%
Cleveland	CLE	2,797	1,260	1,369	1,501	1,260	2,070	2,098	2,216	2,120	2,202	83	3.9%
Las Vegas	LAS	1,098	1,679	756	813	819	1,162	1,216	1,325	1,604	2,092	488	30.4%
Fort Myers	RSW	949	1,525	1,587	1,806	1,734	1,742	1,938	2,173	2,360	2,060	-300	-12.7%
West Palm Beach	PBI	1,674	1,126	1,450	1,235	1,389	1,650	1,652	1,856	2,136	1,978	-157	-7.4%
Jacksonville	JAX		428	365	593	984	767	701	854	1,597	1,900	304	19.0%
Provincetown	PVC	2,023	1,659	2,410	1,982	1,929	1,957	1,912	1,610	1,795	1,785	-10	-0.5%
Phoenix	PHX	1,386	944	1,348	1,413	1,557	1,569	1,552	1,609	1,842	1,692	-150	-8.1%
Houston Intercontinental	IAH	1,995	1,752	1,717	1,789	1,822	1,831	1,618	1,548	1,582	1,584	2	0.1%
Chicago Midway	MDW	868	1,339	1,756	1,617	1,542	1,531	1,604	1,521	1,580	1,538	-42	-2.7%
Lebanon	LEB			1,734	1,460	1,460	1,460	1,464	1,464	1,460	1,460		
Columbus	CMH	2,708	2,114	972	871	844	1,081	1,591	1,416	1,445	1,453	8	0.6%
Washington Dulles	IAD	8,625	6,139	4,625	2,974	2,714	2,505	2,485	2,484	2,457	1,444	-1,013	-41.2%
Rochester	ROC	3,644	1,181	908	878	882	886	767	806	888	1,369	481	54.2%
Indianapolis	IND	765	2,076	1,121	895	844	1,181	1,595	1,511	1,401	1,356	-44	-3.2%
Rockland	RKD	1,152	1,374	1,301	1,279	1,279	1,372	1,348	1,344	1,341	1,350	9	0.7%
Cincinnati	CVG	2,235	2,637	1,364	1,269	1,239	1,218	1,204	1,229	1,253	1,304	51	4.1%
San Diego	SAN	366	365	571	859	1,030	1,052	1,042	1,046	1,191	1,232	41	3.4%

Table E-4 Logan Airport Scheduled Passenger Departures by Destination (Continued)

Destination Airport	Code	2000	2005	2010	2013	2014	2015	2016	2017	2018	2019	2018-2019 Change	2018-2019 % Change
St. Louis	STL	2,187	1,461	934	748	722	722	745	1,021	1,075	1,227	151	14.1%
Augusta	AUG	584	621	1,000	1,248	1,248	1,248	1,220	1,220	1,217	1,226	9	0.7%
Salt Lake City	SLC	1,094	730	669	584	597	617	1,009	1,156	1,179	1,148	-31	-2.6%
Austin	AUS			365	352	352	444	754	855	1,083	1,122	39	3.6%
Saranac Lake	SLK		800	1,174	1,157	1,095	1,095	1,098	1,098	1,095	1,095		
Massena	MSS									552	1,095	543	98.4%
Bar Harbor	BHB	1,196	1,154	815	1,283	1,156	1,095	1,098	1,111	1,095	1,095		
Rutland	RUT	1,259	643	1,095	1,095	1,095	1,095	1,098	1,098	1,095	1,095		
Charleston	CHS		61		398	474	365	545	593	901	1,034	133	14.8%
Milwaukee	MKE	1,189	2,182	2,213	880	674	854	990	1,059	1,131	1,022	-109	-9.7%
New Orleans	MSY		191	348	339	344	365	527	700	1,029	914	-115	-11.2%
Kansas City	MCI	597	241	313	515	669	661	631	684	1,028	886	-142	-13.8%
Portland	PDX			352	615	494	519	555	599	707	746	40	5.6%
Syracuse	SYR	3,876	1,762	991	626	617	578	314	323	678	695	17	2.6%
Houston	HOU				664	1,325	978	1,032	872	795	665	-130	-16.4%
Savannah	SAV		78			306	365	370	423	524	535	11	2.1%
Dallas Love Field	DAL						153	153	366	365	409	44	11.9%
Long Beach	LGB		853	459	274	270	292	297	353	443	403	-41	-9.2%
Hyannis	HYA	2,274	1,059	1,165	705	731	787	775	697	430	383	-48	-11.1%
Myrtle Beach	MYR	105	265	365	378	383	383	379	375	414	378	-35	-8.6%
Portland (ME)	PWM	6,267	1,394								368	368	
Albany	ALB	3,433	1,073	647	1,183	1,095	1,095	1,098	1,098	1,095	360	-735	-67.1%
Harrisburg	MDT	1,307	886	551	469	434	325	300	314	313	330	17	5.6%
Sarasota/Bradenton	SRQ		30	82	348	181	212	186	248	299	306	7	2.3%
Burbank	BUR									113	299	186	164.5%
San Jose	SJC	842	245	232	205	214	223	236	323	286	278	-8	-2.8%
Norfolk	ORF	838	1,032		613	71			105	344	249	-95	-27.6%
Honolulu	HNL										210	210	
Sacramento	SMF						48	57	75	101	88	-13	-13.1%
Oakland	OAK		853	195	83	83	88	79	71	79	44	-35	-44.4%
Palm Springs	PSP										35	35	
Steamboat Springs Hayden	HDN									4	30	26	580.6%
Atlantic City Pomona	ACY			536	123	153	166	366	123				
Plattsburgh	PBG			1,025	639	787	756	697	627	363		-363	-100.0%
Madison	MSN							9					
Westchester County	HPN	6,065	2,256				263	502	422	116		-116	-100.0%
Presque Isle	PQI	1,835	1,017	991	991	991	991	993	993	491		-491	-100.0%
Akron/Canton	CAK		730	475	557	457	287						
Islip	ISP	4,222	1,581		293	324							
Newport News	PHF		671	549		31							
Memphis	MEM	972	1,034	1,048	313								
Bangor	BGR	6,644	2,946										
Greensboro	GSO	415	1,120										
Trenton	TTN												
Watertown	ART												

Table E-4 Logan Airport Scheduled Passenger Departures by Destination (Continued)

Destination Airport	Code	2000	2005	2010	2013	2014	2015	2016	2017	2018	2019	2018-2019 Change	2018-2019 % Change
Burlington	BTV	5,913	1,632										
Allentown/Bethlehem	ABE	780	626										
Louisville	SDF												
Manchester	MHT												
Dayton	DAY												
Plattsburgh	PLB												
Wilkes-Barre Scranton	AVP	584	420										
Columbia	CAE												
Ithaca	ITH	872											
Elmira/Corning	ELM	441											
Hartford	BDL												
Binghamton	BGM												
Providence	PVD	91											
Burlington	BTV	5,913	1,632										
Allentown/Bethlehem	ABE	780	626										
Louisville	SDF												
Manchester	MHT												
Dayton	DAY												
Plattsburgh	PLB												
Wilkes-Barre Scranton	AVP	584	420										
Columbia	CAE												
Ithaca	ITH	872											
Elmira/Corning	ELM	441											
Hartford	BDL												
Binghamton	BGM												
Providence	PVD	91											
International		**23,711**	**19,837**	**18,761**	**19,093**	**20,370**	**21,765**	**25,351**	**26,475**	**27,255**	**27,504**	**249**	**0.9%**
Toronto	YYZ	3,691	3,876	3,603	3,306	2,715	2,799	3,702	3,861	3,898	3,671	-227	-5.8%
London Heathrow	LHR	2,187	2,133	2,331	2,134	2,069	2,026	2,058	1,931	2,074	2,336	261	12.6%
Toronto Island	YTZ			1,535	2,009	2,310	2,236	2,018	2,001	2,006	2,032	26	1.3%
Montreal Dorval	YUL	3,401	2,578	2,008	1,833	1,948	2,047	2,092	2,070	2,293	1,721	-572	-25.0%
San Juan	SJU	1,750	1,237	1,294	1,038	1,018	1,068	1,141	1,058	858	1,011	153	17.8%
Paris De Gaulle	CDG	898	853	710	784	780	916	938	895	938	898	-40	-4.2%
Dublin	DUB	223		348	605	653	653	694	816	815	885	70	8.6%
Halifax	YHZ	3,210	1,891	852	704	704	700	955	1,037	1,064	851	-214	-20.1%
Amsterdam	AMS	366	365	457	575	536	579	580	580	579	714	135	23.4%
Bermuda	BDA	550	518	532	501	523	536	510	598	730	695	-35	-4.8%
Aruba	AUA	9	338	407	408	417	417	471	597	647	685	38	5.9%
Ottawa	YOW	2,575	864	744	652	635	630	649	623	648	639	-8	-1.3%
Santo Domingo	SDQ		174	305	339	401	365	519	406	444	627	183	41.1%
Reykjavik Keflavik	KEF	393	361	404	561	614	854	968	964	870	612	-258	-29.7%
Frankfurt	FRA	580	575	548	545	532	536	515	502	474	501	27	5.7%
Zurich	ZRH	523	356	365	365	365	365	366	467	475	501	26	5.4%
Panama City	PTY					365	334	318	366	556	486	-70	-12.5%

Table E-4 Logan Airport Scheduled Passenger Departures by Destination (Continued)

Destination Airport	Code	2000	2005	2010	2013	2014	2015	2016	2017	2018	2019	2018-2019 Change	2018-2019 % Change
Santiago	STI				214	248	206	275	284	383	475	92	23.9%
Lisbon	LIS	44		26	39	39	44	223	362	322	414	92	28.6%
Rome Leonardo Da Vinci-Fiumicino	FCO		135	313	271	258	271	271	275	275	402	127	46.0%
Mexico City	MEX		234				166	292	301	379	369	-9	-2.4%
London Gatwick	LGW	362						161	218	339	365	26	7.6%
Munich	MUC		210	313	348	357	357	357	366	365	365		
Doha	DOH							284	366	365	365		
Tokyo Narita	NRT				352	365	365	357	366	365	365		
Dubai	DXB					306	457	692	518	365	361	-4	-1.2%
Madrid	MAD			218	209	166	166	205	258	249	353	104	41.6%
Hong Kong	HKG						140	227	327	348	348		
Ponta Delgada	PDL	30	39	165	179	209	196	196	314	322	340	17	5.4%
Istanbul	IST					236	365	340	310	322	339	17	5.4%
Cancun	CUN		207	307	225	273	264	326	331	394	333	-61	-15.5%
Beijing/Peking	PEK					136	287	323	366	348	322	-26	-7.4%
Punta Cana	PUJ			95	134	160	174	214	261	273	265	-8	-2.8%
Shannon	SNN	366	737	213	166	348	352	349	331	335	241	-94	-28.2%
Sao Paulo Guarulhos	GRU									105	235	130	123.4%
Shanghai Pu Dong	PVG						83	157	157	196	209	13	6.6%
Copenhagen	CPH							293	314	174	196	23	13.0%
Nassau	NAS		100	180	108	139	136	133	109	136	187	51	37.2%
Seoul Incheon	ICN										184	184	
Barcelona	BCN									100	156	56	55.8%
Tel Aviv	TLV						75	148	157	148	148	0	0.2%
Montego Bay	MBJ		238	126	56	73	56	52	118	121	126	4	3.5%
Port Au Prince	PAP						26	53	62	114	122	8	7.2%
Edinburgh	EDI										92	92	
Vancouver	YVR	366	62						62	135	92	-43	-32.0%
Bogota	BOG								122	252	90	-162	-64.3%
Providenciales	PLS	4	43	39	52	82	86	104	91	94	86	-8	-8.1%
San Salvador	SAL		178							79	86	8	9.8%
Saint Thomas	STT	78	108	125	173	176	184	186	186		83	83	
Casablanca Mohamed V	CMN										79	79	
Barbados	BGI						9	43	74	74	74		
Terceira	TER	44		17	17	17	31	70	70	65	70	4	6.6%
Havana	HAV									9	52	43	498.4%
Manchester	MAN	26	241					31	122	87	48	-39	-44.9%
Praia	RAI		9	121	104	92	30			48	48		
Saint Maarten	SXM			39	61	52	56	91	95		35	35	
Saint Lucia Hewanorra	UVF					9	26	26	22	26	30	4	17.1%
Puerto Plata	POP	4				9	26	26	26	26	30	4	17.1%
Grand Cayman	GCM		31	17	26	26	26	43	26	26	30	4	17.1%
Liberia	LIR					9	26	26	26	26	26		
Ilha Do Sal	SID		56								4	4	
Oslo	OSL							57	61				

Table E-4 Logan Airport Scheduled Passenger Departures by Destination (Continued)

Destination Airport	**Code**	**2000**	**2005**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2018-2019 Change**	**2018-2019 % Change**
Cologne/Bonn	CGN							52					
Dusseldorf	DUS							101	197				
Pointe-A-Pitre	PTP						9	30	26				
London Stansted	STN									96		-96	-100.0%
Fort De France	FDF						9	43	26				
Sao Vicente	VXE			4									
Charlottetown	YYG												
Helsinki	HEL												
Milan Malpensa	MXP	366	343										
Fredericton	YFC		686										
Quebec	YQB	1,229	30										
Glasgow	GLA												
Connaught	NOC												
Stockholm Arlanda	ARN												
Las Palmas	LPA												
Nykoping	NYO		31										
Lerwick Sumburgh	LSI												
Freeport	FPO												
Brussels	BRU	362											
Gander	YQX												
Athens	ATH	74											
Total Scheduled Carrier Departures		**233,779**	**183,520**	**168,726**	**166,171**	**169,579**	**173,974**	**180,838**	**187,454**	**198,512**	**199,491**	**978**	**0.5%**

Source: OAG Schedules.

F

Regional Transportation

This appendix provides detailed tables in support of Chapter 4, *Regional Transportation*:

Scheduled Passenger Operations by Market and Carrier for New England's Regional Airports

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Table F-1 Aircraft Operations by Classification for New England's Airports, 2000 to 2019

Airport	Bradley International	T.F. Green	Manchester-Boston Regional	Portland International Jetport	Burlington	Bangor	Tweed-New Haven	Worcester Regional	Portsmouth International	Hanscom Field[2]	Subtotal	Logan[3]	Total
2000													
Commercial	132,062	103,750	61,506	47,609	45,745	21,446	5,260	4,029	6,104	6,572	434,083	452,763	886,846
General Aviation[1]	31,863	52,184	45,740	56,571	59,377	34,831	56,200	46,518	31,601	204,512	619,397	35,233	654,630
Military & Other	5,811	2,764	586	2,072	10,241	26,507	328	495	9,973	1,287	60,064	0	60,064
Total	**169,736**	**158,698**	**107,832**	**106,252**	**115,363**	**82,784**	**61,788**	**51,042**	**47,678**	**212,371**	**1,113,544**	**487,996**	**1,601,540**
2001													
Commercial	128,638	100,606	61,669	47,770	47,261	18,286	4,581	5,631	4,485	6,414	425,341	434,386	859,727
General Aviation[1]	30,478	45,095	44,358	62,014	61,986	35,230	56,092	45,464	30,148	197,770	608,635	28,739	637,374
Military & Other	5,913	2,635	607	2,259	11,821	26,623	437	917	8,221	1,252	60,685	0	60,685
Total	**165,029**	**148,336**	**106,634**	**112,043**	**121,068**	**80,139**	**61,110**	**52,012**	**42,854**	**205,436**	**1,094,661**	**463,125**	**1,557,786**
2002													
Commercial	113,194	96,595	62,346	45,899	38,929	24,412	3,827	4,062	5,059	6,603	400,926	366,476	767,402
General Aviation[1]	27,838	45,473	29,549	57,720	59,679	35,711	62,163	52,277	28,333	210,221	608,964	25,596	634,560
Military & Other	6,085	2,587	376	2,162	12,167	27,297	593	418	8,220	1,424	61,329	0	61,329
Total	**147,117**	**144,655**	**92,271**	**105,781**	**110,775**	**87,420**	**66,583**	**56,757**	**41,612**	**218,248**	**1,071,219**	**392,072**	**1,463,291**
2003													
Commercial	103,917	84,301	68,184	42,658	38,293	25,626	3,705	868	4,552	2,956	375,060	344,644	719,704
General Aviation[1]	27,115	42,878	29,552	44,036	50,461	36,706	54,224	55,972	24,866	190,789	556,599	28,660	585,259
Military & Other	4,214	2,496	324	1,449	11,466	32,938	776	378	7,720	1,142	62,903	0	62,903
Total	**135,246**	**129,675**	**98,060**	**88,143**	**100,220**	**95,270**	**58,705**	**57,218**	**37,138**	**194,887**	**994,562**	**373,304**	**1,367,866**
2004													
Commercial	108,823	83,496	75,360	46,474	41,719	24,970	4,501	0	3,981	4,308	393,632	374,022	767,654
General Aviation[1]	32,269	34,878	27,438	41,547	54,709	29,884	58,881	61,343	25,962	175,301	542,212	31,236	573,448
Military & Other	4,100	346	749	1,338	12,404	29,676	1,010	530	7,797	1,195	59,145	0	59,145
Total	**145,192**	**118,720**	**103,547**	**89,359**	**108,832**	**84,530**	**64,392**	**61,873**	**37,740**	**180,804**	**994,989**	**405,258**	**1,400,247**

Table F-1 Aircraft Operations by Classification for New England's Airports, 2000 to 2019 (Continued)

Airport	Bradley International	T.F. Green	Manchester-Boston Regional	Portland International Jetport	Burlington	Bangor	Tweed-New Haven	Worcester Regional	Portsmouth International	Hanscom Field[2]	Subtotal	Logan[3]	Total
2005													
Commercial	119,048	88,374	76,342	42,661	43,987	25,976	6,137	2,727	3,197	3,627	412,076	377,830	789,906
General Aviation[1]	33,341	28,138	26,369	36,191	49,888	30,016	60,893	62,743	25,446	165,424	518,449	31,236	549,685
Military & Other	3,701	241	479	1,405	11,468	24,154	1,063	519	7,669	904	51,603	0	51,603
Total	**156,090**	**116,753**	**103,190**	**80,257**	**105,343**	**80,146**	**68,093**	**65,989**	**36,312**	**169,955**	**982,128**	**409,066**	**1,391,194**
2006													
Commercial	111,341	81,282	67,326	38,663	41,342	23,466	5,177	3,793	3,981	3,057	379,428	374,675	754,103
General Aviation[1]	34,548	25,510	25,074	35,572	44,471	29,848	51,702	56,770	25,962	167,560	497,017	31,444	528,461
Military & Other	4,348	229	738	1,536	9,299	22,359	1,157	609	7,797	1,433	49,505	0	49,505
Total	**150,237**	**107,021**	**93,138**	**75,771**	**95,112**	**75,673**	**58,036**	**61,172**	**37,740**	**172,050**	**925,950**	**406,119**	**1,332,069**
2007													
Commercial	107,097	80,525	69,134	41,450	39,928	22,571	4,594	3,162	4,270	3,477	376,208	370,905	747,113
General Aviation[1]	29,308	22,984	23,959	31,724	47,521	25,542	51,200	61,296	27,000	160,992	481,526	28,632	510,158
Military & Other	5,097	242	644	1,384	9,528	20,949	944	879	8,017	1,438	49,122	0	49,122
Total	**141,502**	**103,751**	**93,737**	**74,558**	**96,977**	**69,062**	**56,738**	**65,337**	**39,287**	**165,907**	**906,856**	**399,537**	**1,306,393**
2008													
Commercial	98,194	73,096	63,505	40,834	37,832	19,282	4,013	2,553	1,347	104	340,760	347,784	688,544
General Aviation[1]	22,908	19,470	16,198	31,869	46,391	27,143	44,642	43,763	31,051	164,195	447,630	23,820	471,450
Military & Other	3,637	187	840	974	9,688	20,449	243	886	7,993	1,590	46,487	0	46,487
Total	**124,739**	**92,753**	**80,543**	**73,677**	**93,911**	**66,874**	**48,898**	**47,202**	**40,391**	**165,889**	**834,877**	**371,604**	**1,206,481**
2009													
Commercial	82,021	62,233	54,336	35,909	31,153	16,485	3,096	2,527	422	0	288,182	333,064	621,246
General Aviation[1]	19,586	19,438	14,354	25,473	32,872	19,558	37,722	41,700	25,161	148,696	384,560	12,242	396,802
Military & Other	2,726	260	1,163	778	8,628	16,267	486	17	6,851	1,215	38,391	0	38,391
Total	**104,333**	**81,931**	**69,853**	**62,160**	**72,653**	**52,310**	**41,304**	**44,244**	**32,434**	**149,911**	**711,133**	**345,306**	**1,056,439**

Table F-1 Aircraft Operations by Classification for New England's Airports, 2000 to 2019 (Continued)

Airport	Bradley International	T.F. Green	Manchester-Boston Regional	Portland International Jetport	Burlington	Bangor	Tweed-New Haven	Worcester Regional	Portsmouth International	Hanscom Field[2]	Subtotal	Logan[3]	Total
2010													
Commercial	80,418	60,128	53,971	35,035	29,538	16,190	3,201	1,629	1,516	0	281,626	337,961	619,587
General Aviation[1]	18,759	21,096	13,636	24,776	36,106	20,142	31,884	41,843	25,674	161,942	395,858	14,682	410,540
Military & Other	3,028	347	933	446	4,776	15,525	381	572	7,707	1,795	35,510	0	35,510
Total	**102,205**	**81,571**	**68,540**	**60,257**	**70,420**	**51,857**	**35,466**	**44,044**	**34,897**	**163,737**	**712,994**	**352,643**	**1,065,637**
2011													
Commercial	86,838	57,194	51,379	35,157	29,166	16,177	3,367	2,017	1,717	750	283,762	340,757	624,519
General Aviation[1]	16,483	21,774	12,497	21,453	42,562	19,503	33,919	44,050	27,056	160,840	400,137	28,230	428,367
Military & Other	3,630	369	874	533	5,890	13,220	310	634	8,158	1,409	35,027	0	35,027
Total	**106,951**	**79,337**	**64,750**	**57,143**	**77,618**	**48,900**	**37,596**	**46,701**	**36,931**	**162,999**	**718,926**	**368,987**	**1,087,913**
2012													
Commercial	79,704	50,301	45,379	33,118	27,067	14,826	3,936	1,639	502	635	257,107	326,755	583,862
General Aviation[1]	15,589	24,781	12,504	20,864	42,352	18,069	34,775	42,655	30,186	164,841	406,616	28,114	434,730
Military & Other	3,726	434	1,073	584	7,079	11,503	416	740	7,917	738	34,210	0	34,210
Total	**99,019**	**75,516**	**58,956**	**54,566**	**76,498**	**44,398**	**39,127**	**45,034**	**38,605**	**166,214**	**697,933**	**354,869**	**1,052,802**
2013													
Commercial	78,213	48,340	43,572	31,076	26,814	14,707	4,094	1,586	560	253	249,215	334,657	583,872
General Aviation[1]	15,192	24,729	11,432	20,021	40,413	15,535	28,794	32,888	28,951	153,706	371,661	26,682	398,343
Military & Other	2,558	435	1,224	471	6,972	11,045	423	593	7,573	529	31,823	0	31,823
Total	**95,963**	**73,504**	**56,228**	**51,568**	**74,199**	**41,287**	**33,311**	**35,067**	**37,084**	**154,488**	**652,699**	**361,339**	**1,014,038**
2014													
Commercial	79,060	44,351	38,674	29,538	26,057	14,428	4,795	2,368	8,278	256	247,805	337,381	585,186
General Aviation[1]	14,752	29,490	12,293	16,535	40,858	15,548	26,273	29,138	24,440	133,437	342,764	26,416	369,180
Military & Other	2,665	1,036	908	560	6,842	11,567	529	956	7,621	602	33,286	0	33,286
Total	**96,477**	**74,877**	**51,875**	**46,633**	**73,757**	**41,543**	**31,597**	**32,462**	**40,339**	**134,295**	**623,855**	**363,797**	**987,652**

Table F-1 Aircraft Operations by Classification for New England's Airports, 2000 to 2019 (Continued)

Airport	Bradley International	T.F. Green	Manchester-Boston Regional	Portland International Jetport	Burlington	Bangor[4]	Tweed-New Haven	Worcester Regional	Portsmouth International	Hanscom Field[2 4]	Subtotal	Logan[3]	Total
2015													
Commercial	76,425	42,417	38,060	30,415	25,178	13,618	6,316	2,414	8,547	220	243,610	344,764	588,374
General Aviation[1]	14,402	22,700	12,934	17,916	41,576	16,487	27,711	35,711	26,848	127,467	343,752	28,166	371,918
Military & Other	2,680	430	811	567	5,912	10,684	685	889	7,499	592	30,749	0	30,749
Total	**93,507**	**65,547**	**51,805**	**48,898**	**72,666**	**40,789**	**34,712**	**39,014**	**42,894**	**128,279**	**618,111**	**372,930**	**991,041**
2016													
Commercial	77,174	43,659	40,589	32,171	26,405	14,603	7,195	2,616	9,435	266	254,113	360,442	614,555
General Aviation[1]	14,460	26,032	14,447	18,334	38,614	16,815	28,811	31,858	29,043	120,891	339,305	30,780	370,085
Military & Other	3,178	397	501	488	6,114	11,271	683	780	8,913	632	32,957	0	32,957
Total	**94,812**	**70,088**	**55,537**	**50,993**	**71,133**	**42,689**	**36,689**	**35,254**	**47,391**	**121,789**	**626,375**	**391,222**	**1,017,597**
2017													
Commercial	78,435	45,831	37,850	32,845	26,684	15,874	6,820	2,925	9,597	295	257,156	370,251	627,407
General Aviation[1]	13,233	26,274	13,169	18,392	34,386	17,157	18,389	26,332	31,555	128,018	326,905	31,120	358,025
Military & Other	3,006	490	697	568	5,080	9,985	574	850	8,150	759	30,159	0	30,159
Total	**94,674**	**72,595**	**51,716**	**51,805**	**66,150**	**43,016**	**25,783**	**30,107**	**49,302**	**129,072**	**614,220**	**401,371**	**1,015,591**

Table F-1 Aircraft Operations by Classification for New England's Airports, 2000 to 2019 (Continued)

Airport	Bradley International	T.F. Green	Manchester-Boston Regional	Portland International Jetport	Burlington	Bangor	Tweed-New Haven	Worcester Regional	Portsmouth International	Hanscom Field[2]	Subtotal	Logan[3]	Total
2018													
Commercial	78,463	49,425	36,085	35,534	28,611	17,241	6,038	3,710	8,709	286	264,102	393,084	657,186
General Aviation[1]	13,280	21,124	15,664	20,717	38,078	16,670	18,220	14,473	30,424	120,945	309,595	30,940	340,535
Military & Other	2,898	399	423	675	3,547	9,758	536	753	7,600	433	27,022	0	27,022
Total	**94,641**	**70,948**	**52,172**	**56,926**	**70,236**	**43,669**	**24,794**	**18,936**	**46,733**	**121,664**	**600,719**	**424,024**	**1,024,743**
2019													
Commercial	76,352	46,393	34,965	35,855	28,413	17,678	6,094	4,441	9,346	426	259,963	398,254	658,217
General Aviation[1]	12,652	23,017	15,762	21,731	40,894	17,117	21,853	15,621	28,742	127,755	325,144	28,922	354,066
Military & Other	2,379	351	412	646	3,963	10,805	483	701	3,457	490	23,687	0	23,687
Total	**91,383**	**69,761**	**51,139**	**58,232**	**73,270**	**45,600**	**28,430**	**20,763**	**41,545**	**128,671**	**608,794**	**427,176**	**1,035,970**

Source: Massport, Federal Aviation Administration (FAA) Tower Counts, and individual airport records.

1 Includes itinerant and local general aviation operations at the regional airports. There are no local (touch-and-go training) operations at Logan Airport.

2 Commercial operations at Hanscom Field include scheduled commercial operations only; other air taxi operations counted as GA.

3 Operations at Logan Airport include international operations.

4 Updated 2016 and 2017 figures for Bangor and Hanscom airports compared to the *2017 ESPR*.

Table F-2 Percentage Change in Aircraft Operations by Classification for New England's Airports, 2000 to 2019

Airport	Bradley International	T.F. Green	Manchester-Boston Regional	Portland International Jetport	Burlington	Bangor	Tweed-New Haven	Worcester Regional	Portsmouth International	Hanscom Field[2]	Subtotal	Logan[3]	Total
2000 to 2001													
Commercial	(2.59%)	(3.03%)	0.27%	0.34%	3.31%	(14.73%)	(12.91%)	39.76%	(26.52%)	(2.40%)	(2.01%)	(4.06%)	(3.06%)
General Aviation[1]	(4.35%)	(13.58%)	(3.02%)	9.62%	4.39%	1.15%	(0.19%)	(2.27%)	(4.60%)	(3.30%)	(1.74%)	(18.43%)	(2.64%)
Military & Other	1.76%	(4.67%)	3.58%	9.03%	15.43%	0.44%	33.23%	85.25%	(17.57%)	(2.72%)	1.03%	-	1.03%
Total	**(2.77%)**	**(6.53%)**	**(1.11%)**	**5.45%**	**4.95%**	**(3.20%)**	**(1.10%)**	**1.90%**	**(10.12%)**	**(3.27%)**	**(1.70%)**	**(5.10%)**	**(2.73%)**
2001 Percent of Total	**10.59%**	**9.52%**	**6.85%**	**7.19%**	**7.77%**	**5.14%**	**3.92%**	**3.34%**	**2.75%**	**13.19%**	**70.27%**	**29.73%**	**100.00%**
2001 to 2002													
Commercial	(12.01%)	(3.99%)	1.10%	(3.92%)	(17.63%)	33.50%	(16.46%)	(27.86%)	12.80%	2.95%	(5.74%)	(15.63%)	(10.74%)
General Aviation[1]	(8.66%)	0.84%	(33.39%)	(6.92%)	(3.72%)	1.37%	10.82%	14.99%	(6.02%)	6.30%	0.05%	(10.94%)	(0.44%)
Military & Other	2.91%	(1.82%)	(38.06%)	(4.29%)	2.93%	2.53%	35.70%	(54.42%)	(0.01%)	13.74%	1.06%	-	1.06%
Total	**(10.85%)**	**(2.48%)**	**(13.47%)**	**(5.59%)**	**(8.50%)**	**9.09%**	**8.96%**	**9.12%**	**(2.90%)**	**6.24%**	**(2.14%)**	**(15.34%)**	**(6.07%)**
2002 Percent of Total	**10.05%**	**9.89%**	**6.31%**	**7.23%**	**7.57%**	**5.97%**	**4.55%**	**3.88%**	**2.84%**	**14.91%**	**73.21%**	**26.79%**	**100.00%**
2002 to 2003													
Commercial	(8.20%)	(12.73%)	9.36%	(7.06%)	(1.63%)	4.97%	(3.19%)	(78.63%)	(10.02%)	(55.23%)	(6.45%)	(5.96%)	(6.22%)
General Aviation[1]	(2.60%)	(5.71%)	0.01%	(23.71%)	(15.45%)	2.79%	(12.77%)	7.07%	(12.24%)	(9.24%)	(8.60%)	11.97%	(7.77%)
Military & Other	(30.75%)	(3.52%)	(13.83%)	(32.98%)	(5.76%)	20.67%	30.86%	(9.57%)	(6.08%)	(19.80%)	2.57%	-	2.57%
Total	**(8.07%)**	**(10.36%)**	**6.27%**	**(16.67%)**	**(9.53%)**	**8.98%**	**(11.83%)**	**0.81%**	**(10.75%)**	**(10.70%)**	**(7.16%)**	**(4.79%)**	**(6.52%)**
2003 Percent of Total	**9.89%**	**9.48%**	**7.17%**	**6.44%**	**7.33%**	**6.96%**	**4.29%**	**4.18%**	**2.72%**	**14.25%**	**72.71%**	**27.29%**	**100.00%**
2003 to 2004													
Commercial	4.72%	(0.95%)	10.52%	8.95%	8.95%	(2.56%)	21.48%	(100.00%)	(12.54%)	45.74%	4.95%	8.52%	6.66%
General Aviation[1]	19.01%	(18.66%)	(7.15%)	(5.65%)	8.42%	(18.59%)	8.59%	9.60%	4.41%	(8.12%)	(2.58%)	8.99%	(2.02%)
Military & Other	(2.71%)	(86.14%)	131.17%	(7.66%)	8.18%	(9.90%)	30.15%	40.21%	1.00%	4.64%	(5.97%)	-	(5.97%)
Total	**7.35%**	**(8.45%)**	**5.60%**	**1.38%**	**8.59%**	**(11.27%)**	**9.69%**	**8.14%**	**1.62%**	**(7.23%)**	**0.04%**	**8.56%**	**2.37%**
2004 Percent of Total	**10.37%**	**8.48%**	**7.39%**	**6.38%**	**7.77%**	**6.04%**	**4.60%**	**4.42%**	**2.70%**	**12.91%**	**71.06%**	**28.94%**	**100.00%**

Table F-2 Percentage Change in Aircraft Operations by Classification for New England's Airports, 2000 to 2019 (Continued)

Airport	Bradley International	T.F. Green	Manchester-Boston Regional	Portland International Jetport	Burlington	Bangor	Tweed-New Haven	Worcester Regional	Portsmouth International	Hanscom Field[2]	Subtotal	Logan[3]	Total
2004 to 2005													
Commercial	9.40%	5.84%	1.30%	(8.20%)	5.44%	4.03%	36.35%	-	(19.69%)	(15.81%)	4.69%	1.02%	2.90%
General Aviation[1]	3.32%	(19.32%)	(3.90%)	(12.89%)	(8.81%)	0.44%	3.42%	2.28%	(1.99%)	(5.63%)	(4.38%)	0.00%	(4.14%)
Military & Other	(9.73%)	(30.35%)	(36.05%)	5.01%	(7.55%)	(18.61%)	5.25%	(2.08%)	(1.64%)	(24.35%)	(12.75%)	-	(12.75%)
Total	**7.51%**	**(1.66%)**	**(0.34%)**	**(10.19%)**	**(3.21%)**	**(5.19%)**	**5.75%**	**6.65%**	**(3.78%)**	**(6.00%)**	**(1.29%)**	**0.94%**	**(0.65%)**
2005 Percent of Total	**11.22%**	**8.39%**	**7.42%**	**5.77%**	**7.57%**	**5.76%**	**4.89%**	**4.74%**	**2.61%**	**12.22%**	**70.60%**	**29.40%**	**100.00%**
2005 to 2006													
Commercial	(6.47%)	(8.02%)	(11.81%)	(9.37%)	(6.01%)	(9.66%)	(15.64%)	39.09%	24.52%	(15.72%)	(7.92%)	(0.84%)	(4.53%)
General Aviation[1]	3.62%	(9.34%)	(4.91%)	(1.71%)	(10.86%)	(0.56%)	(15.09%)	(9.52%)	2.03%	1.29%	(4.13%)	0.67%	(3.86%)
Military & Other	17.48%	(4.98%)	54.07%	9.32%	(18.91%)	(7.43%)	8.84%	17.34%	1.67%	58.52%	(4.07%)	-	(4.07%)
Total	**(3.75%)**	**(8.34%)**	**(9.74%)**	**(5.59%)**	**(9.71%)**	**(5.58%)**	**(14.77%)**	**(7.30%)**	**3.93%**	**1.23%**	**(5.72%)**	**(0.72%)**	**(4.25%)**
2006 Percent of Total	**11.28%**	**8.03%**	**6.99%**	**5.69%**	**7.14%**	**5.68%**	**4.36%**	**4.59%**	**2.83%**	**12.92%**	**69.51%**	**30.49%**	**100.00%**
2006 to 2007													
Commercial	(3.81%)	(0.93%)	2.69%	7.21%	(3.42%)	(3.81%)	(11.26%)	(16.64%)	7.26%	13.74%	(0.85%)	(1.01%)	(0.93%)
General Aviation[1]	(15.17%)	(9.90%)	(4.45%)	(10.82%)	6.86%	(14.43%)	(0.97%)	7.97%	4.00%	(3.92%)	(3.12%)	(8.94%)	(3.46%)
Military & Other	17.23%	5.68%	(12.74%)	(9.90%)	2.46%	(6.31%)	(18.41%)	44.33%	2.82%	0.35%	(0.77%)	-	(0.77%)
Total	**(5.81%)**	**(3.06%)**	**0.64%**	**(1.60%)**	**1.96%**	**(8.74%)**	**(2.24%)**	**6.81%**	**4.10%**	**(3.57%)**	**(2.06%)**	**(1.62%)**	**(1.93%)**
2007 Percent of Total	**10.83%**	**7.94%**	**7.18%**	**5.71%**	**7.42%**	**5.29%**	**4.34%**	**5.00%**	**3.01%**	**12.70%**	**69.42%**	**30.58%**	**100.00%**
2007 to 2008													
Commercial	(8.31%)	(9.23%)	(8.14%)	(1.49%)	(5.25%)	(14.57%)	(12.65%)	(19.26%)	(68.45%)	(97.01%)	(9.42%)	(6.23%)	(7.84%)
General Aviation[1]	(21.84%)	(15.29%)	(32.39%)	0.46%	(2.38%)	6.27%	(12.81%)	(28.60%)	15.00%	1.99%	(7.04%)	(16.81%)	(7.59%)
Military & Other	(28.64%)	(22.73%)	30.43%	(29.62%)	1.68%	(2.39%)	(74.26%)	0.80%	(0.30%)	10.57%	(5.36%)	-	(5.36%)
Total	**(11.85%)**	**(10.60%)**	**(14.08%)**	**(1.18%)**	**(3.16%)**	**(3.17%)**	**(13.82%)**	**(27.76%)**	**2.81%**	**(0.01%)**	**(7.94%)**	**(6.99%)**	**(7.65%)**
2008 Percent of Total	**10.34%**	**7.69%**	**6.68%**	**6.11%**	**7.78%**	**5.54%**	**4.05%**	**3.91%**	**3.35%**	**13.75%**	**69.20%**	**30.80%**	**100.00%**

Table F-2 Percentage Change in Aircraft Operations by Classification for New England's Airports, 2000 to 2019 (Continued)

Airport	Bradley International	T.F. Green	Manchester-Boston Regional	Portland International Jetport	Burlington	Bangor	Tweed-New Haven	Worcester Regional	Portsmouth International	Hanscom Field[2]	Subtotal	Logan[3]	Total
2008 to 2009													
Commercial	(16.47%)	(14.86%)	(14.44%)	(12.06%)	(17.65%)	(14.51%)	(22.85%)	(1.02%)	(68.67%)	(100.00%)	(15.43%)	(4.23%)	(9.77%)
General Aviation[1]	(14.50%)	(0.16%)	(11.38%)	(20.07%)	(29.14%)	(27.94%)	(15.50%)	(4.71%)	(18.97%)	(9.44%)	(14.09%)	(48.61%)	(15.83%)
Military & Other	(25.05%)	39.04%	38.45%	(20.12%)	(10.94%)	(20.45%)	100.00%	(98.08%)	(14.29%)	(23.58%)	(17.42%)	-	(17.42%)
Total	**(16.36%)**	**(11.67%)**	**(13.27%)**	**(15.63%)**	**(22.64%)**	**(21.78%)**	**(15.53%)**	**(6.27%)**	**(19.70%)**	**(9.63%)**	**(14.82%)**	**(7.08%)**	**(12.44%)**
2009 Percent of Total	**9.88%**	**7.76%**	**6.61%**	**5.88%**	**6.88%**	**4.95%**	**3.91%**	**4.19%**	**3.07%**	**14.19%**	**67.31%**	**32.69%**	**100.00%**
2009 to 2010													
Commercial	(1.95%)	(3.38%)	(0.67%)	(2.43%)	(5.18%)	(1.79%)	3.39%	(35.54%)	259.24%	-	(2.27%)	1.47%	(0.27%)
General Aviation[1]	(4.22%)	8.53%	(5.00%)	(2.74%)	9.84%	2.99%	(15.48%)	0.34%	2.04%	8.91%	2.94%	19.93%	3.46%
Military & Other	11.08%	33.46%	(19.78%)	(42.67%)	(44.65%)	(4.56%)	(21.60%)	3264.71%	12.49%	47.74%	(7.50%)	-	(7.50%)
Total	**(2.04%)**	**(0.44%)**	**(1.88%)**	**(3.06%)**	**(3.07%)**	**(0.87%)**	**(14.13%)**	**(0.45%)**	**7.59%**	**9.22%**	**0.26%**	**2.12%**	**0.87%**
2010 Percent of Total	**9.59%**	**7.65%**	**6.43%**	**5.65%**	**6.61%**	**4.87%**	**3.33%**	**4.13%**	**3.27%**	**15.37%**	**66.91%**	**33.09%**	**100.00%**
2010 to 2011													
Commercial	7.98%	(4.88%)	(4.80%)	0.35%	(1.26%)	(0.08%)	5.19%	23.82%	13.26%	-	0.76%	0.83%	0.80%
General Aviation[1]	(12.13%)	3.21%	(8.35%)	(13.41%)	17.88%	(3.17%)	6.38%	5.27%	5.38%	(0.68%)	1.08%	92.28%	4.34%
Military & Other	19.88%	6.34%	(6.32%)	19.51%	23.32%	(14.85%)	(18.64%)	10.84%	5.85%	(21.50%)	(1.36%)	-	(1.36%)
Total	**4.64%**	**(2.74%)**	**(5.53%)**	**(5.17%)**	**10.22%**	**(5.70%)**	**6.01%**	**6.03%**	**5.83%**	**(0.45%)**	**0.83%**	**4.63%**	**2.09%**
2011 Percent of Total	**9.83%**	**7.29%**	**5.95%**	**5.25%**	**7.13%**	**4.49%**	**3.46%**	**4.29%**	**3.39%**	**14.98%**	**66.08%**	**33.92%**	**100.00%**
2012 to 2013													
Commercial	(1.87%)	(3.90%)	(3.98%)	(6.17%)	(0.93%)	(0.80%)	4.01%	(3.23%)	11.55%	(60.16%)	(3.07%)	2.42%	0.00%
General Aviation[1]	(2.55%)	(0.21%)	(8.57%)	(4.04%)	(4.58%)	(14.02%)	(17.20%)	(22.90%)	(4.09%)	(6.75%)	(8.60%)	(5.09%)	(8.37%)
Military & Other	(31.35%)	0.23%	14.07%	(19.35%)	(1.51%)	(3.98%)	1.68%	(19.86%)	(4.35%)	(28.32%)	(6.98%)	-	(6.98%)
Total	**(3.09%)**	**(2.66%)**	**(4.63%)**	**(5.49%)**	**(3.01%)**	**(7.01%)**	**(14.86%)**	**(22.13%)**	**(3.94%)**	**(7.05%)**	**(6.48%)**	**1.82%**	**(3.68%)**
2013 Percent of Total	**9.46%**	**7.25%**	**5.54%**	**5.09%**	**7.32%**	**4.07%**	**3.28%**	**3.46%**	**3.66%**	**15.23%**	**64.37%**	**35.63%**	**100.00%**

Table F-2 Percentage Change in Aircraft Operations by Classification for New England's Airports, 2000 to 2019 (Continued)

Airport	Bradley International	T.F. Green	Manchester-Boston Regional	Portland International Jetport	Burlington	Bangor[4]	Tweed-New Haven	Worcester Regional	Portsmouth International	Hanscom Field[2 4]	Subtotal	Logan[3]	Total
2013 to 2014													
Commercial	1.08%	(8.25%)	(11.24%)	(4.95%)	(2.82%)	(1.90%)	17.12%	49.31%	1378.21%	1.19%	(0.57%)	0.81%	0.23%
General Aviation[1]	(2.90%)	19.25%	7.53%	(17.41%)	1.10%	0.08%	(8.76%)	(11.40%)	(15.58%)	(13.19%)	(7.78%)	(1.00%)	(7.32%)
Military & Other	4.18%	138.16%	(25.82%)	18.90%	(1.86%)	4.73%	25.06%	61.21%	0.63%	13.80%	4.60%	-	4.60%
Total	**0.54%**	**1.87%**	**(7.74%)**	**(9.57%)**	**(0.60%)**	**0.62%**	**(5.15%)**	**(7.43%)**	**8.78%**	**(13.07%)**	**(4.42%)**	**0.68%**	**(2.60%)**
2014 Percent of Total	**9.77%**	**7.58%**	**5.25%**	**4.72%**	**7.47%**	**4.21%**	**3.20%**	**3.29%**	**4.08%**	**13.60%**	**63.17%**	**36.83%**	**100.00%**
2014 to 2015													
Commercial	(3.33%)	(4.36%)	(1.59%)	2.97%	(3.37%)	(5.61%)	31.72%	1.94%	3.25%	(14.06%)	(1.69%)	2.19%	0.54%
General Aviation[1]	(2.37%)	(23.02%)	5.21%	8.35%	1.76%	6.04%	5.47%	22.56%	9.85%	(4.47%)	0.29%	6.62%	0.74%
Military & Other	0.56%	(58.49%)	(10.68%)	1.25%	(13.59%)	(7.63%)	29.49%	(7.01%)	(1.60%)	(1.66%)	(7.62%)	-	(7.62%)
Total	**(3.08%)**	**(12.46%)**	**(0.13%)**	**4.86%**	**(1.48%)**	**(1.81%)**	**9.86%**	**20.18%**	**6.33%**	**(4.48%)**	**(0.92%)**	**2.51%**	**0.34%**
2015 Percent of Total	**9.44%**	**6.61%**	**5.23%**	**4.93%**	**7.33%**	**4.12%**	**3.50%**	**3.94%**	**4.33%**	**12.94%**	**62.37%**	**37.63%**	**100.00%**
2015 to 2016													
Commercial	0.98%	2.93%	6.64%	5.77%	4.87%	7.23%	13.92%	8.37%	10.39%	20.91%	4.31%	4.55%	4.45%
General Aviation[1]	0.40%	14.68%	11.70%	2.33%	(7.12%)	1.99%	3.97%	(10.79%)	8.18%	(5.16%)	(1.29%)	9.28%	(0.49%)
Military & Other	18.58%	(7.67%)	(38.22%)	(13.93%)	3.42%	5.49%	(0.29%)	(12.26%)	18.86%	6.76%	7.18%	-	7.18%
Total	**1.40%**	**6.93%**	**7.20%**	**4.28%**	**(2.11%)**	**4.66%**	**5.70%**	**(9.64%)**	**10.48%**	**(5.06%)**	**1.34%**	**4.90%**	**2.68%**
2016 Percent of Total	**9.32%**	**6.89%**	**5.46%**	**5.01%**	**6.99%**	**4.20%**	**3.61%**	**3.46%**	**4.66%**	**11.97%**	**61.55%**	**38.45%**	**100.00%**
2016 to 2017													
Commercial	1.63%	4.97%	(6.75%)	2.10%	1.06%	8.70%	(5.21%)	11.81%	1.72%	10.90%	1.20%	2.72%	2.09%
General Aviation[1]	(8.49%)	0.93%	(8.85%)	0.32%	(10.95%)	2.03%	(36.17%)	(17.35%)	8.65%	5.90%	(3.65%)	1.10%	(3.26%)
Military & Other	(5.41%)	23.43%	39.12%	16.39%	(16.91%)	(11.41%)	(15.96%)	8.97%	(8.56%)	20.09%	(8.49%)	-	(8.49%)
Total	**(0.15%)**	**3.58%**	**(6.88%)**	**1.59%**	**(7.01%)**	**0.77%**	**(29.73%)**	**(14.60%)**	**4.03%**	**5.98%**	**(1.94%)**	**2.59%**	**(0.20%)**
2017 Percent of Total	**9.32%**	**7.15%**	**5.09%**	**5.10%**	**6.51%**	**4.24%**	**2.54%**	**2.96%**	**4.85%**	**12.71%**	**60.48%**	**39.52%**	**100.00%**

Table F-2 Percentage Change in Aircraft Operations by Classification for New England's Airports, 2000 to 2019 (Continued)

Airport	Bradley International	T.F. Green	Manchester-Boston Regional	Portland International Jetport	Burlington	Bangor	Tweed-New Haven	Worcester Regional	Portsmouth International	Hanscom Field[2]	Subtotal	Logan[3]	Total
2017 to 2018													
Commercial	0.04%	7.84%	(4.66%)	8.19%	7.22%	8.61%	(11.47%)	26.84%	(9.25%)	(2.05%)	2.70%	6.17%	4.75%
General Aviation[1]	0.36%	(19.60%)	18.95%	12.64%	10.74%	(3.21%)	(0.92%)	(45.04%)	(3.58%)	(5.31%)	(5.23%)	(0.58%)	(4.83%)
Military & Other	(3.59%)	(18.57%)	(39.31%)	18.84%	(30.18%)	(2.47%)	(6.62%)	(11.41%)	(6.75%)	(25.34%)	(9.93%)	-	(9.93%)
Total	**(0.03%)**	**(2.27%)**	**0.88%**	**9.89%**	**6.18%**	**1.32%**	**(3.84%)**	**(37.10%)**	**(5.21%)**	**(5.39%)**	**(2.14%)**	**5.64%**	**0.94%**
2019 Percent of Total	**9.24%**	**6.92%**	**5.09%**	**5.56%**	**6.85%**	**4.26%**	**2.42%**	**1.85%**	**4.56%**	**11.87%**	**58.62%**	**41.38%**	**100.00%**
2018 to 2019													
Commercial	(2.69%)	(6.13%)	(3.10%)	0.90%	(0.69%)	2.53%	0.93%	19.70%	7.31%	48.95%	(1.57%)	1.32%	0.16%
General Aviation[1]	(4.73%)	8.96%	0.63%	4.89%	7.40%	2.68%	19.94%	7.93%	(5.53%)	5.63%	5.02%	(6.52%)	3.97%
Military & Other	(17.91%)	(12.03%)	(2.60%)	(4.30%)	11.73%	10.73%	(9.89%)	(6.91%)	(54.51%)	13.16%	(12.34%)	-	(12.34%)
Total	**(3.44%)**	**(1.67%)**	**(1.98%)**	**2.29%**	**4.32%**	**4.42%**	**14.66%**	**9.65%**	**(11.10%)**	**5.76%**	**1.34%**	**0.74%**	**1.10%**
2019 Percent of Total	**8.82%**	**6.73%**	**4.94%**	**5.62%**	**7.07%**	**4.40%**	**2.74%**	**2.00%**	**4.01%**	**12.42%**	**58.77%**	**41.23%**	**100.00%**

Source: Massport, Federal Aviation Administration (FAA) Tower Counts, and individual airport records.

1 Includes itinerant and local general aviation operations at the regional airports. There are no local (touch-and-go training) operations at Logan Airport.

2 Commercial operations at Hanscom Field include scheduled commercial operations only; other air taxi operations counted as GA.

3 Operations at Logan Airport include international operations.

4 Updated 2016 and 2017 figures for Bangor and Hanscom airports compared to the *2017 ESPR*.

Table F-3 Scheduled Passenger Operations by Market and Carrier for Bradley International Airport

Carrier	Market	Code	Departures 2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change	Departing Seats 2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
Jet Carriers																								
Aer Lingus	Dublin	DUB						66	305	292	287	-4	-1.5%						11,657	53,934	51,659	56,457	4,798	9.3%
Alaska	Chicago O'Hare	ORD	30									-	-	4,050									-	-
America West	Columbus	CMH	149									-	-	18,441									-	-
America West	Las Vegas	LAS	210									-	-	27,469									-	-
America West	Phoenix	PHX	275									-	-	37,772									-	-
American	Charlotte	CLT				1,763	1,775	1,918	1,982	1,968	2,108	140	7.1%				257,645	244,756	278,511	306,378	298,319	314,805	16,486	5.5%
American	Chicago O'Hare	ORD	2,139					240	671	636	964	328	51.6%	304,855					35,717	102,663	101,714	154,171	52,457	51.6%
American	Dallas/Fort Worth	DFW	1,343	1,052	1,069	1,008	695	678	678	669	590	-79	-11.8%	185,922	160,983	171,017	157,952	103,576	101,001	103,275	107,063	94,400	-12,663	-11.8%
American	Los Angeles	LAX	214		122	243		205	330	301	267	-34	-11.3%	31,244		19,520	38,880		30,588	50,150	48,137	42,578	-5,559	-11.5%
American	Miami	MIA	366	413	396	476	400	365	361	361	352	-9	-2.5%	51,427	63,559	63,360	74,981	59,600	54,342	55,105	57,714	58,050	336	0.6%
American	Philadelphia	PHL				265	31	271	382	842	847	6	0.7%				29,004	3,069	28,245	38,044	93,690	109,517	15,826	16.9%
American	New York J F Kennedy	JFK										-	-										-	-
American	San Juan	SJU	366	365								-	-	69,348	55,856								-	-
American	St. Louis	STL										-	-										-	-
American	Washington National	DCA				103	18	17	4			-	-				12,536	2,196	1,680	567			-	-
Boston-Maine Airways	Fort Lauderdale/Hollywood	FLL										-	-										-	-
Continental	Cleveland	CLE	582									-	-	68,974									-	-
Continental	Houston Intercontinental	IAH	366									-	-	45,790									-	-
Continental	New York Newark	EWR	331									-	-	38,916									-	-
Delta	Atlanta	ATL	2,192	2,099	2,109	2,391	2,374	2,360	2,290	2,335	2,391	56	2.4%	392,835	300,185	319,290	355,968	354,751	354,943	343,403	367,313	386,814	19,501	5.3%
Delta	Boston	BOS	4									-	-	634									-	-
Delta	Cancun	CUN		35	13	17	35	39	35	35	17	-18	-50.6%		5,470	1,973	2,571	5,207	5,956	5,049	5,584	3,086	-2,499	-44.7%
Delta	Cincinnati	CVG	1,464				4					-	-	244,837				471					-	-
Delta	Detroit	DTW		1,003	753	1,053	1,375	1,366	1,333	1,308	1,522	213	16.3%		129,228	110,361	145,867	187,833	184,729	183,762	199,048	190,939	-8,109	-4.1%
Delta	Fort Lauderdale/Hollywood	FLL	732	237								-	-	87,108	33,674								-	-
Delta	Fort Myers	RSW		99								-	-		13,104								-	-
Delta	Las Vegas	LAS		9								-	-		1,394								-	-
Delta	Los Angeles	LAX		83								-	-		13,257								-	-
Delta	Minneapolis	MSP		758	549	605	858	662	803	931	1,007	76	8.1%		99,431	82,545	87,377	114,722	96,039	105,445	129,502	131,162	1,659	1.3%

Table F-3 Scheduled Passenger Operations by Market and Carrier for Bradley International Airport (Continued)

			Departures											Departing Seats										
Carrier	**Market**	**Code**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**
Delta	New York J F Kennedy	JFK	183									-	-	39,894									-	-
Delta	Orlando	MCO	1,838	261	57			4			9	9	-	218,705	99,129	8,514			471			959	959	-
Delta	Salt Lake City	SLC										-	-										-	-
Delta	Tampa	TPA		813								-	-		33,625								-	-
Delta	West Palm Beach	PBI	732	205								-	-	87,108	37,536								-	-
Frontier	Denver	DEN									96	96	-									17,280	17,280	-
Frontier	Miami	MIA									30											5,477	5,477	-
Frontier	Orlando	MCO									127											28,136	28,136	-
Frontier	Raleigh/Durham	RDU									83											14,966	14,966	-
jetBlue	Washington National	DCA				402	730	714	730	717	349	-368	-51.3%				40,229	85,300	77,600	73,000	71,686	34,914	-36,771	-51.3%
jetBlue	Fort Lauderdale/Hollywood	FLL		101	612	590	590	568	726	739	691	-47	-6.4%		15,086	91,800	87,836	88,479	85,264	108,836	110,371	103,714	-6,657	-6.0%
jetBlue	Fort Myers	RSW			61	181	212	242	242	242	242	-				9,150	27,150	31,800	36,300	36,300	36,300	38,740	2,440	6.7%
jetBlue	Orlando	MCO		101	730	747	730	746	730	730	826	96	13.1%		15,086	109,500	112,071	109,500	111,100	109,500	109,500	123,879	14,379	13.1%
jetBlue	San Juan	SJU			365	405	465	561	587	497	660	163	32.9%			54,793	60,729	69,686	84,150	88,114	74,550	99,043	24,493	32.9%
jetBlue	Tampa	TPA			61	365	365	365	409	417	365	-52	-12.5%			9,150	44,693	48,750	54,750	61,286	62,550	54,750	-7,800	-12.5%
jetBlue	West Palm Beach	PBI			365	365	365	387	365	365	446	81	22.1%			54,750	44,907	45,550	51,929	51,700	54,750	71,737	16,987	31.0%
Laker Airways (Bahamas)	Freeport	FPO	39									-	-	5,850									-	-
Midway Airlines	Raleigh/Durham	RDU	683									-	-	69,213									-	-
Midwest/Republic	Milwaukee	MKE	619									-	-	44,455									-	-
Northwest	Amsterdam	AMS										-	-										-	-
Northwest	Detroit	DTW	1,699									-	-	215,750									-	-
Northwest	Fort Myers	RSW										-	-										-	-
Northwest	Minneapolis	MSP	1,177									-	-	135,570									-	-
Northwest	Orlando	MCO										-	-										-	-
Northwest	Tampa	TPA										-	-										-	-
Northwest	West Palm Beach	PBI										-	-										-	-
Norwegian Air	Edinburgh	EDI							70	26		-26	-100.0%							13,124	4,860		-4,860	-100.0%
Southwest	Atlanta	ATL			174	1,086	172					-	-			20,391	131,627	24,482					-	-

Table F-3 Scheduled Passenger Operations by Market and Carrier for Bradley International Airport (Continued)

			Departures											Departing Seats											
Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
Southwest	Baltimore	BWI	2,841	2,700	2,610	2,448	2,435	2,514	2,486	2,343	2,000	-343	-14.6%	389,158	367,534	372,650	353,791	353,038	372,278	363,930	344,395	294,277	-50,118	-14.6%
Southwest	Chicago Midway	MDW	723	923	967	961	974	966	944	949	883	-66	-6.9%	99,090	126,412	146,270	142,513	147,672	148,701	139,257	148,117	135,369	-12,748	-8.6%
Southwest	Denver	DEN		306	365	374	374	374	404	391	327	-64	-16.3%		41,922	54,860	58,570	61,917	60,234	67,673	66,912	54,781	-12,131	-18.1%
Southwest	Fort Lauderdale/Hollywood	FLL		70	348	369	387	387	387	382	242	-140	-36.6%		9,551	49,521	53,381	57,309	56,240	59,892	58,854	37,591	-21,263	-36.1%
Southwest	Fort Myers	RSW			203	216	212	212	276	227	229	2	0.9%			28,917	30,949	30,586	30,586	42,698	35,041	35,794	752	2.1%
Southwest	Las Vegas	LAS	52	361	245	245	306	306	245	232		-232	-100.0%	7,163	49,398	34,876	35,035	44,037	46,551	40,640	38,879		-38,879	-100.0%
Southwest	Nashville	BNA	672	361								-	-	92,064	49,398								-	-
Southwest	Orlando	MCO	375	1,016	944	975	1,003	999	1,056	995	1,008	12	1.2%	51,336	139,212	136,115	140,866	151,806	156,562	157,068	151,005	154,334	3,329	2.2%
Southwest	Philadelphia	PHL										-	-										-	-
Southwest	St. Louis	STL								153	356										25,225	58,077	32,852	130.2%
Southwest	Tampa	TPA		570	629	656	651	642	712	665	686	21	3.2%		78,129	90,219	93,662	93,905	93,646	108,758	106,234	108,402	2,168	2.0%
Southwest	West Palm Beach	PBI					4	4	9	4	4	-						633	633	1,246	633	633	-	
Spirit	Fort Lauderdale/Hollywood	FLL							184	507	521	14	2.7%							26,680	83,055	83,934	879	1.1%
Spirit	Fort Myers	RSW							61	142	151	9	6.4%							11,102	25,870	27,534	1,664	6.4%
Spirit	Myrtle Beach	MYR							140	258	258	0	-0.1%							25,558	46,025	45,656	-369	-0.8%
Spirit	Orlando	MCO							245	643	696	53	8.2%							37,782	106,128	114,939	8,811	8.3%
Spirit	Tampa	TPA							61	195	212	17	8.8%							11,102	35,412	38,532	3,120	8.8%
Sunworld International	Philadelphia	PHL										-	-										-	-
Trans World Airlines	Portland (ME)	PWM	305									-	-	43,310									-	-
Trans World Airlines	St. Louis	STL	1,460									-	-	206,109									-	-
United	Chicago O'Hare	ORD	2,034	1,296	593	800	554	605	727	897	988	91	10.2%	299,522	198,709	86,911	112,864	72,529	84,972	100,094	122,199	145,068	22,869	18.7%
United	Denver	DEN	366					275	365	365	365	-		46,901					36,838	53,945	54,996	60,713	5,717	10.4%
United	New York Newark	EWR			18				190	226		-226	-100.0%			2,126				27,237	33,464		-33,464	-100.0%
United	San Francisco	SFO	366						75	92		-92	-100.0%	45,384						8,983	11,776		-11,776	-100.0%
United	Washington Dulles	IAD	1,455	1,192	180	222	82	472	430	858	750	-108	-12.6%	173,869	155,750	25,418	32,132	11,182	73,998	64,261	129,208	111,930	-17,278	-13.4%
US Airways	Baltimore	BWI	488									-	-	41,760									-	-
US Airways	Charlotte	CLT	1,464	1,588	1,734							-	-	214,719	228,119	255,885							-	-
US Airways	Fort Lauderdale/Hollywood	FLL	366									-	-	39,232									-	-

Table F-3 Scheduled Passenger Operations by Market and Carrier for Bradley International Airport (Continued)

			Departures											Departing Seats										
Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
US Airways	Orlando	MCO	1,098									-	-	117,696									-	-
US Airways	Philadelphia	PHL	2,148	361	365							-	-	310,118	49,914	49,083							-	-
US Airways	Phoenix	PHX										-	-										-	-
US Airways	Pittsburgh	PIT	1,800									-	-	278,575									-	-
US Airways	Washington Dulles	IAD	732									-	-	86,376									-	-
US Airways	Washington National	DCA	1,329	361	208							-	-	171,891	51,434	25,610							-	-
US Airways	West Palm Beach	PBI	366									-	-	39,232									-	-
USA 3000 Airlines	Cancun	CUN										-	-										-	-
USA 3000 Airlines	Punta Cana	PUJ										-	-										-	-
Subtotal			**38,171**	**18,695**	**16,845**	**19,331**	**18,175**	**19,530**	**22,030**	**23,934**	**23,953**	**19**	**0.1%**	**5,179,671**	**2,622,086**	**2,484,577**	**2,765,786**	**2,604,342**	**2,846,211**	**3,237,541**	**3,607,739**	**3,643,137**	**35,398**	**1.0%**
Regional/ Commuter Carriers																								
Air Canada Express	Montreal Dorval	YUL	1,385	1,021	952	996	1,008	1,038	1,021	684	343	-341	-49.9%	19,392	19,399	17,144	17,925	18,141	18,692	18,381	18,894	17,042	-1,852	-9.8%
Air Canada Express	Toronto	YYZ	1,589	1,287	1,295	1,313	1,395	1,399	1,391	1,352	1,013	-339	-25.1%	61,991	36,960	28,103	25,102	25,118	35,328	40,045	45,448	46,424	976	2.1%
America West Express	Columbus	CMH	450									-	-	22,493									-	-
American Connection	St. Louis	STL										-	-										-	-
American Eagle	Charlotte	CLT				366	290	156	127	157	91	-65	-41.7%				28,940	22,265	11,774	10,062	11,609	6,474	-5,135	-44.2%
American Eagle	Chicago O'Hare	ORD		1,501	1,630	1,622	1,604	1,421	685	718	546	-172	-23.9%		79,594	90,663	115,856	115,366	93,468	43,137	46,412	38,769	-7,643	-16.5%
American Eagle	New York J F Kennedy	JFK	1,460									-	-	48,166									-	-
American Eagle	Philadelphia	PHL				2,234	2,502	2,133	1,684	1,249	914	-335	-26.8%				136,683	146,222	123,285	103,743	73,671	53,306	-20,365	-27.6%
American Eagle	Pittsburgh	PIT				939	782					-	-				67,549	39,086					-	-
American Eagle	Raleigh/Durham	RDU		257								-	-		10,774								-	-
American Eagle	St. Louis	STL										-	-										-	-
American Eagle	Washington National	DCA				2,119	2,125	2,251	2,476	2,184	2,064	-120	-5.5%				141,783	130,975	142,309	147,169	124,991	124,954	-37	0.0%
Continental Connection	Albany	ALB										-	-										-	-
Continental Connection	Binghamton	BGM										-	-										-	-

Table F-3 Scheduled Passenger Operations by Market and Carrier for Bradley International Airport (Continued)

			Departures											Departing Seats										
Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
Continental Connection	Boston	BOS										-	-										-	-
Continental Connection	Buffalo	BUF	89									-	-	1,683									-	-
Continental Connection	Burlington	BTV	4									-	-	84									-	-
Continental Connection	New York J F Kennedy	JFK										-	-										-	-
Continental Connection	New York Newark	EWR		608								-	-		22,485								-	-
Continental Connection	Philadelphia	PHL										-	-										-	-
Continental Connection	Rochester	ROC	93									-	-	1,767									-	-
Continental Connection	Syracuse	SYR	97									-	-	1,851									-	-
Continental Express	Cleveland	CLE	803	1,208								-	-	39,357	60,400								-	-
Continental Express	New York Newark	EWR	1,747	465								-	-	82,365	23,264								-	-
Delta Connection	Atlanta	ATL			4	4	4					-	-			279	288	326					-	-
Delta Connection	Cincinnati	CVG		1,218	895	839	475	300	308	305	313	8	2.6%		61,642	44,757	43,557	25,537	22,800	22,353	22,251	22,679	428	1.9%
Delta Connection	Cleveland	CLE				170	243	266	300	304	313	8	2.8%				11,898	15,450	19,798	22,800	23,106	23,777	672	2.9%
Delta Connection	Columbus	CMH										-	-										-	-
Delta Connection	Detroit	DTW		1,004	1,195	659	313	264	271	78	27	-52	-66.0%		54,265	80,351	45,421	20,860	18,905	20,193	5,939	2,019	-3,919	-66.0%
Delta Connection	Fort Lauderdale/Hollywood	FLL										-	-										-	-
Delta Connection	Fort Myers	RSW										-	-										-	-
Delta Connection	Indianapolis	IND										-	-										-	-
Delta Connection	Minneapolis	MSP		481	812	738	342	539	467	331	345	14	4.3%		36,567	61,035	55,233	25,556	40,845	34,547	25,123	25,844	721	2.9%
Delta Connection	Myrtle Beach	MYR	61									-	-	3,057									-	-
Delta Connection	New York J F Kennedy	JFK		365								-	-		18,250								-	-
Delta Connection	Orlando	MCO				43	35	8	9	13		-13	-100.0%				3,156	2,354	641	662	938		-938	-100.0%
Delta Connection	Raleigh/Durham	RDU		100	270	257	261	253	308	313	313	-			6,136	13,500	12,850	17,611	18,054	23,441	23,454	23,777	323	1.4%
Delta Connection	Tampa	TPA										-	-										-	-
Delta Connection	Washington National	DCA		166								-	-		11,324								-	-

Table F-3 Scheduled Passenger Operations by Market and Carrier for Bradley International Airport (Continued)

			Departures											Departing Seats										
Carrier	**Market**	**Code**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**’18-’19 Change**	**’18-’19 Pct. Change**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**’18-’19 Change**	**’18-’19 Pct. Change**
Delta Connection	West Palm Beach	PBI										-	-										-	-
Frontier Express	Milwaukee	MKE		140								-	-		6,313								-	-
Independence Air	Washington Dulles	IAD										-	-										-	-
Midway Airlines	Raleigh/Durham	RDU	1,348									-	-	67,393									-	-
Midwest Connect	Milwaukee	MKE	4									-	-	142									-	-
Northwest Airlink	Detroit	DTW										-	-										-	-
Northwest Airlink	Indianapolis	IND										-	-										-	-
Northwest Airlink	Memphis	MEM										-	-										-	-
Northwest Airlink	Minneapolis	MSP										-	-										-	-
OneJet	Pittsburgh	PIT						289	521	346		-346	-100.0%						2,597	4,344	5,706		-5,706	-100.0%
Shuttle America	Albany	ALB	66									-	-	3,286									-	-
Shuttle America	Bedford	BED	233									-	-	11,671									-	-
Shuttle America	Buffalo	BUF	337									-	-	16,857									-	-
Shuttle America	Islip	ISP	27									-	-	1,329									-	-
Shuttle America	Wilmington	ILG	159									-	-	7,936									-	-
Swissair	New York J F Kennedy	JFK	31									-	-	1,023									-	-
Trans World Airlines	New York J F Kennedy	JFK	1,098									-	-	31,842									-	-
United Express	Chicago O'Hare	ORD		548	1,045	877	904	696	509	617	338	-279	-45.2%		36,797	59,896	47,419	60,980	45,255	34,256	40,539	23,571	-16,967	-41.9%
United Express	Cleveland	CLE			1,127	235						-	-			56,436	11,750						-	-
United Express	Houston	IAH				96	365	361	293	100	352	253	253.7%				7,521	26,998	25,240	20,583	6,982	24,650	17,668	253.1%
United Express	New York Newark	EWR			1,269	853	1,335	1,357	866	533		-533	-100.0%			61,339	38,317	65,086	69,442	39,881	27,903		-27,903	-100.0%
United Express	Washington Dulles	IAD		494	1,280	1,224	1,243	870	965	581	680	99	17.1%		30,270	72,861	68,684	77,783	56,035	61,327	38,720	47,246	8,526	22.0%
US Airways Express	Baltimore	BWI	1,185									-	-	43,850									-	-
US Airways Express	Buffalo	BUF	1,032									-	-	38,200									-	-
US Airways Express	Charlotte	CLT		537	364							-	-		45,043	28,392							-	-

Table F-3 Scheduled Passenger Operations by Market and Carrier for Bradley International Airport (Continued)

Departures

Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
US Airways Express	New York La Guardia	LGA		139								-	-
US Airways Express	New York Newark	EWR										-	-
US Airways Express	Philadelphia	PHL		2,404	2,260							-	-
US Airways Express	Pittsburgh	PIT		939	939							-	-
US Airways Express	Rochester	ROC	937	478								-	-
US Airways Express	Syracuse	SYR	732									-	-
US Airways Express	Washington National	DCA		1,334	1,825							-	-
Subtotal			**14,968**	**16,694**	**17,164**	**15,584**	**15,226**	**13,601**	**12,201**	**9,863**	**7,651**	**-2,211**	**-22.4%**
Total			**53,139**	**35,389**	**34,009**	**34,915**	**33,402**	**33,131**	**34,231**	**33,797**	**31,605**	**-2,192**	**-6.5%**

Departing Seats

Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
US Airways Express	New York La Guardia	LGA		5,159								-	-
US Airways Express	New York Newark	EWR										-	-
US Airways Express	Philadelphia	PHL		183,838	133,663							-	-
US Airways Express	Pittsburgh	PIT		46,929	77,901							-	-
US Airways Express	Rochester	ROC	34,658	16,242								-	-
US Airways Express	Syracuse	SYR	27,084									-	-
US Airways Express	Washington National	DCA		89,629	115,989							-	-
Subtotal			**567,477**	**901,282**	**942,310**	**879,932**	**835,714**	**744,468**	**646,924**	**541,685**	**480,533**	**-61,152**	**-11.3%**
Total			**5,747,148**	**3,523,368**	**3,426,886**	**3,645,718**	**3,440,056**	**3,590,679**	**3,884,465**	**4,149,424**	**4,123,671**	**-25,754**	**-0.6%**

Source: OAG Schedules.

Notes: Allegiant stopped reporting to the OAG in 2009, so Allegiant 2009-2016 statistics from the T100 database; 2017-2019 statistics from OAG, which recommenced reporting.

All Northwest Airlines operations included in Delta Air Lines from 2009 onwards (following 2008 merger).

All Continental Airlines operations included in United Airlines from 2011 onwards (following 2010 merger).

All AirTran Airways operations included in Southwest Airlines from 2012 onwards (following 2011 merger).

All US Airways operations included in American Airlines from 2014 onwards (following 2013 merger).

Table F-4 Scheduled Passenger Operations by Market and Carrier for T.F Green Airport

			Departures											Departing Seats										
Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
Jet Carriers																								
Allegiant Airways	Cincinnati	CVG							13	39	26	-13	-33.1%							2,028	6,954	4,653	-2,301	-33.1%
Allegiant Airways	Punta Gorda	PGD							27	70	100	30	42.9%							4,779	12,390	17,700	5,310	42.9%
Allegiant Airways	St. Petersburg/Clearwater	PIE							19	61		-61	-100.0%							3,363	9,901		-9,901	-100.0%
Allegiant Airways	Savannah	SAV									52	52	-									9,255	9,255	-
American	Charlotte	CLT				1,275	1,176	1,274	1,392	1,465	1,366	-99	-6.7%				196,644	170,310	189,856	213,892	227,561	208,083	-19,478	-8.6%
American	Chicago O'Hare	ORD	1,464									-	-	203,104									-	-
American	Dallas/Fort Worth	DFW										-	-										-	-
American	Miami	MIA									73	73	-									9,362	9,362	-
American	Philadelphia	PHL				347	366	520	995	1,186	914	-272	-22.9%				34,381	36,514	50,988	97,768	131,961	112,780	-19,181	-14.5%
American	Washington National	DCA				77	52					-	-				9,566	6,483					-	-
Continental	Cleveland	CLE	569									-	-	69,771									-	-
Continental	Houston Intercontinental	IAH	366									-	-	45,946									-	-
Continental	New York Newark	EWR	738									-	-	96,448									-	-
Condor	Frankfurt	FRA					22	18				-	-					5,940	4,783				-	-
Delta	Atlanta	ATL	1,464	510	978	993	997	1,060	1,047	1,035	1,043	8	0.8%	207,888	72,461	145,241	148,012	148,078	156,507	155,384	154,567	157,584	3,017	2.0%
Delta	Cincinnati	CVG	732									-	-	103,944									-	-
Delta	Detroit	DTW		414	218	476	707	719	715	414	414	-1	-0.2%		50,065	30,414	62,046	87,078	91,281	90,875	54,004	52,203	-1,800	-3.3%
Delta	Fort Lauderdale/Hollywood	FLL										-	-										-	-
Delta	Minneapolis	MSP		74								-	-		9,211								-	-
Delta	Orlando	MCO	732									-	-	87,108									-	-
Frontier	Atlanta	ATL								39		-39	-100.0%								7,020		-7,020	-100.0%
Frontier	Austin	AUS								35		-35	-100.0%								6,249		-6,249	-100.0%
Frontier	Charlotte	CLT								131	114	-17	-13.1%								30,097	21,569	-8,529	-28.3%
Frontier	Denver	DEN							144	179	74	-104	-58.4%							25,946	35,037	13,397	-21,640	-61.8%
Frontier	Fort Myers	RSW							53	65	56	-8	-13.1%							12,091	14,194	10,106	-4,089	-28.8%
Frontier	Miami	MIA							92	90		-90	-100.0%							16,560	16,200		-16,200	-100.0%
Frontier	Myrtle Beach	MYR								70		-70	-100.0%								16,067		-16,067	-100.0%
Frontier	New Orleans	MSY							39	25		-25	-100.0%							5,914	3,793		-3,793	-100.0%
Frontier	Orlando	MCO							153	308	252	-56	-18.1%							32,140	63,943	50,550	-13,393	-20.9%

Table F-4 Scheduled Passenger Operations by Market and Carrier for T.F Green Airport (Continued)

			Departures											Departing Seats										
Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
Frontier	Raleigh/Durham	RDU								96	57	-39	-40.8%								22,080	10,234	-11,846	-53.6%
Frontier	Tampa	TPA							39	135	95	-40	-29.5%							9,069	26,151	17,074	-9,077	-34.7%
jetBlue	Fort Lauderdale/Hollywood	FLL			365	365	365	365	365	365	365	-				54,750	54,750	54,750	54,750	54,750	54,750	54,750	-	
jetBlue	Orlando	MCO			713	713	713	713	713	642	598	-43	-6.7%			103,786	106,886	106,886	106,886	106,886	93,850	89,764	-4,086	-4.4%
jetBlue	West Palm Beach	PBI									297	297	-									44,614	44,614	-
Laker Airways (Bahamas)	Freeport	FPO										-	-										-	-
Northwest	Detroit	DTW	1,682									-	-	200,509									-	-
Northwest	Minneapolis	MSP										-	-										-	-
Norwegian Air	Belfast	BFS							35	61		-61	-100.0%							6,642	11,556		-11,556	-100.0%
Norwegian Air	Bergen	BGO							35			-	-							6,642			-	-
Norwegian Air	Cork	ORK							70	117	26	-91	-77.7%							13,257	22,194	4,941	-17,253	-77.7%
Norwegian Air	Dublin	DUB							114	252	222	-31	-12.2%							21,546	47,709	41,711	-5,998	-12.6%
Norwegian Air	Edinburgh	EDI							88	117		-117	-100.0%							16,578	22,194		-22,194	-100.0%
Norwegian Air	Fort De France	FDF							17	26		-26	-100.0%							3,259	4,809		-4,809	-100.0%
Norwegian Air	Pointe-A-Pitre	PTP							17	26		-26	-100.0%							3,259	4,809		-4,809	-100.0%
Norwegian Air	Shannon	SNN							53	148	35	-113	-76.4%							9,936	27,972	6,588	-21,384	-76.4%
SATA Internacional	Ponta Delgada	PDL						9	22	17		-17	-100.0%						1,966	4,852	3,983		-3,983	-100.0%
Southern Airways Express	Nantucket	ACK									96	96	-									868	868	-
Southwest	Baltimore	BWI	3,913	3,260	3,004	2,820	2,793	2,793	2,719	2,602	2,189	-413	-15.9%	535,911	442,637	429,658	411,154	407,651	414,057	401,718	384,098	325,736	-58,362	-15.2%
Southwest	Chicago Midway	MDW	1,072	1,135	992	975	988	996	953	948	828	-121	-12.7%	146,844	153,121	154,633	156,543	158,640	153,783	147,916	147,685	132,158	-15,527	-10.5%
Southwest	Denver	DEN			304	9						-	-			44,281	1,246						-	-
Southwest	Fort Lauderdale/Hollywood	FLL	9	594	479	474	477	485	507	528	446	-82	-15.6%	1,194	81,378	70,413	68,401	70,778	74,477	78,412	81,576	66,813	-14,763	-18.1%
Southwest	Fort Myers	RSW			40	44	48	52	82	91	61	-30	-33.1%			5,520	6,292	7,305	7,918	12,046	13,292	9,109	-4,182	-31.5%
Southwest	Houston	HOU	152									-	-	20,824									-	-
Southwest	Islip	ISP	608									-	-	83,237									-	-
Southwest	Kansas City	MCI	366									-	-	50,142									-	-
Southwest	Las Vegas	LAS		365								-	-		50,005								-	-

Table F-4 Scheduled Passenger Operations by Market and Carrier for T.F Green Airport (Continued)

			Departures											Departing Seats										
Carrier	**Market**	**Code**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**
Southwest	Nashville	BNA	706	296								-	-	96,702	39,578								-	-
Southwest	Orlando	MCO	955	1,799	1,423	1,419	1,464	1,469	1,390	1,294	1,253	-41	-3.2%	130,855	245,156	210,082	204,947	215,253	219,994	209,238	205,374	198,408	-6,966	-3.4%
Southwest	Philadelphia	PHL		1,402								-	-		192,054								-	-
Southwest	Phoenix	PHX	366	361								-	-	50,142	49,398								-	-
Southwest	Tampa	TPA	745	813	753	748	735	713	673	585	588	3	0.4%	102,065	111,231	107,959	107,481	108,451	107,723	100,790	89,945	92,161	2,216	2.5%
Southwest	West Palm Beach	PBI			31	35	31	31	22	4	4	-				4,433	5,046	4,433	4,433	3,105	775	633	-142	-18.3%
Southwest	Washington National	DCA						122	730	730	752	22	3.0%						19,119	104,390	105,633	109,189	3,555	3.4%
Spirit	Detroit	DTW										-	-										-	-
Spirit	Fort Lauderdale/Hollywood	FLL										-	-										-	-
Spirit	Fort Myers	RSW										-	-										-	-
Sun Country	Las Vegas	LAS									30	30	-									4,929	4,929	-
Sun Country	Minneapolis	MSP									127	127	-									19,746	19,746	-
Sun Country	Nashville	BNA									122	122	-									18,555	18,555	-
Sun Country	New Orleans	MSY									22	22	-									3,518	3,518	-
TACV	Praia	RAI					39	74	65	4		-4	-100.0%					7,739	14,578	13,003	872		-872	-100.0%
United	Chicago O'Hare	ORD	1,477	644	334	320	144	236		57		-57	-100.0%	239,076	82,802	46,258	42,658	17,570	31,940		7,241		-7,241	-100.0%
US Airways	Baltimore	BWI	2,462									-	-	263,921									-	-
US Airways	Charlotte	CLT	977	1,643	1,608							-	-	128,984	233,886	225,454							-	-
US Airways	Fort Lauderdale/Hollywood	FLL										-	-										-	-
US Airways	Orlando	MCO	52									-	-	5,605									-	-
US Airways	Philadelphia	PHL	1,830	1,299	313							-	-	253,015	130,008	30,973							-	-
US Airways	Pittsburgh	PIT	1,339									-	-	185,109									-	-
US Airways	Washington National	DCA	1,333	365	124							-	-	167,278	49,501	14,997							-	-
Subtotal			**26,108**	**14,974**	**11,677**	**11,090**	**11,116**	**11,649**	**13,399**	**14,057**	**12,698**	**-1,359**	**-9.7%**	**3,475,622**	**1,992,492**	**1,678,851**	**1,616,053**	**1,613,859**	**1,705,039**	**1,988,034**	**2,168,485**	**1,918,741**	**-249,744**	**-11.5%**

Table F-4 Scheduled Passenger Operations by Market and Carrier for T.F Green Airport (Continued)

			Departures											Departing Seats										
Carrier	**Market**	**Code**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**
Regional/ Commuter Carriers																								
Air Canada Express	Toronto	YYZ	989	625	84					140	105	-35	-24.9%	37,482	11,880	1,517					6,986	5,243	-1,743	-24.9%
American Eagle	Charlotte	CLT				175	341	301	187	266	278	12	4.6%				13,971	26,810	25,452	15,629	19,929	20,865	936	4.7%
American Eagle	Chicago O'Hare	ORD						550	717	704	909	205	29.2%						34,650	45,162	51,465	69,117	17,652	34.3%
American Eagle	Detroit	DTW										-	-										-	-
American Eagle	New York J F Kennedy	JFK	1,291									-	-	42,589									-	-
American Eagle	New York La Guardia	LGA	2,756									-	-	90,957									-	-
American Eagle	Raleigh/Durham	RDU										-	-										-	-
American Eagle	Philadelphia	PHL				2,213	2,163	1,982	1,035	791	895	105	13.2%				150,139	142,721	127,895	77,726	58,489	61,358	2,869	4.9%
American Eagle	Washington National	DCA				1,609	1,755	2,112	2,252	2,242	2,247	4	0.2%				111,183	111,865	138,655	148,758	135,774	139,649	3,876	2.9%
Cape Air	Block Island	BID				538	418					-	-				4,846	3,765					-	-
Cape Air	Hyannis	HYA										-	-										-	-
Cape Air	Martha's Vineyard	MVY	1,762	747	501	285	192					-	-	15,861	6,722	4,513	2,561	1,725					-	-
Cape Air	Nantucket	ACK	2,453	681	501	271	244					-	-	22,073	6,128	4,510	2,438	2,196					-	-
Continental Connection	Albany	ALB										-	-										-	-
Continental Connection	Boston	BOS										-	-										-	-
Continental Connection	New York Newark	EWR		427								-	-		31,630								-	-
Continental Connection	Plattsburgh	PLB										-	-										-	-
Continental Connection	Washington Dulles	IAD										-	-										-	-
Continental Express	Cleveland	CLE	699	1,217								-	-	34,936	60,836								-	-
Continental Express	New York Newark	EWR	1,482	1,028								-	-	86,552	51,407								-	-
Delta Connection	Atlanta	ATL		724	70	51	43					-	-		52,959	4,522	3,380	3,001					-	-
Delta Connection	Cincinnati	CVG		43								-	-		2,150								-	-
Delta Connection	Detroit	DTW		1,324	1,748	871	289	324	279	769	804	35	4.6%		78,701	90,191	45,809	18,671	22,103	20,162	56,330	60,218	3,888	6.9%
Delta Connection	Minneapolis	MSP		347	240	170						-	-		26,192	17,380	12,878						-	-

Table F-4 Scheduled Passenger Operations by Market and Carrier for T.F Green Airport (Continued)

			Departures											Departing Seats										
Carrier	**Market**	**Code**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**
Delta Connection	New York J F Kennedy	JFK										-	-										-	-
Delta Connection	New York La Guardia	LGA	610									-	-	19,520									-	-
Delta Connection	Raleigh/Durham	RDU										-	-										-	-
Delta Connection	Washington National	DCA										-	-										-	-
Independence Air	Washington Dulles	IAD										-	-										-	-
Midway Airlines	Raleigh/Durham	RDU										-	-										-	-
Northwest Airlink	Detroit	DTW										-	-										-	-
Northwest Airlink	Minneapolis	MSP										-	-										-	-
OneJet	Pittsburgh	PIT							87	149		-149	-100.0%							610	1,045		-1,045	-100.0%
United Express	Chicago O'Hare	ORD		455	306	325	605	464	673	610	942	332	54.4%		29,820	19,896	19,443	34,473	24,750	42,292	39,764	51,047	11,283	28.4%
United Express	Cleveland	CLE			875	102						-	-			43,757	5,100						-	-
United Express	New York Newark	EWR			1,213	994	1,356	1,355	1,382	1,255	1,043	-212	-16.9%			65,636	57,558	73,682	64,804	71,607	72,633	54,037	-18,596	-25.6%
United Express	Washington Dulles	IAD	1,468	1,569	1,035	1,031	837	886	782	1,089	1,084	-5	-0.5%	52,832	99,719	65,632	67,077	52,139	55,328	46,877	67,692	66,611	-1,080	-1.6%
US Airways Express	Albany	ALB	679									-	-	12,898									-	-
US Airways Express	Boston	BOS	48									-	-	909									-	-
US Airways Express	Charlotte	CLT		126	166							-	-		10,047	12,857							-	-
US Airways Express	Hyannis	HYA										-	-										-	-
US Airways Express	Nantucket	ACK										-	-										-	-
US Airways Express	New York La Guardia	LGA	2,298	1,222								-	-	84,116	45,225								-	-
US Airways Express	New York Newark	EWR	1,569									-	-	31,176									-	-
US Airways Express	Philadelphia	PHL	366	1,526	2,347							-	-	13,542	107,790	154,401							-	-
US Airways Express	Pittsburgh	PIT										-	-										-	-
US Airways Express	Plattsburgh	PLB	26									-	-	497									-	-
US Airways Express	Washington National	DCA		1,373	1,492							-	-		92,151	107,775							-	-
Subtotal			**18,527**	**13,436**	**10,577**	**8,635**	**8,243**	**7,974**	**7,394**	**8,015**	**8,306**	**291**	**3.6%**	**546,963**	**713,356**	**592,587**	**496,383**	**471,048**	**493,637**	**468,823**	**510,107**	**528,146**	**18,039**	**3.5%**
Total			**44,635**	**28,409**	**22,255**	**19,725**	**19,359**	**19,623**	**20,793**	**22,072**	**21,004**	**-1,068**	**-4.8%**	**4,022,585**	**2,705,848**	**2,271,438**	**2,112,436**	**2,084,907**	**2,198,676**	**2,456,857**	**2,678,592**	**2,446,887**	**-231,705**	**-8.7%**

Source: OAG Schedules.
Notes: Allegiant stopped reporting to the OAG in 2009, so Allegiant 2009-2016 statistics from the T100 database; 2017-2019 statistics from OAG, which recommenced reporting.
All Northwest Airlines operations included in Delta Air Lines from 2009 onwards (following 2008 merger).
All Continental Airlines operations included in United Airlines from 2011 onwards (following 2010 merger).
All AirTran Airways operations included in Southwest Airlines from 2012 onwards (following 2011 merger).
All US Airways operations included in American Airlines from 2014 onwards (following 2013 merger).

Table F-5 Scheduled Passenger Operations by Market and Carrier for Manchester-Boston Regional Airport

			Departures											Departing Seats											
Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
Jet Carriers																								
American	Charlotte	CLT							52			-	-							6,674			-	-
American	Philadelphia	PHL								562	155	-407	-72.5%								55,652	18,005	-37,647	-67.6%
Boston-Maine Airways	Myrtle Beach	MYR										-	-										-	-
Boston-Maine Airways	Portsmouth	PSM										-	-										-	-
Boston-Maine Airways	Sanford	SFB										-	-										-	-
Continental	Cleveland	CLE	130									-	-	16,151									-	-
Continental	New York Newark	EWR	462									-	-	62,358									-	-
Delta	Atlanta	ATL	244	275	463	459	365	365	365	361	271	-90	-24.9%	34,648	39,050	69,307	68,468	53,545	54,212	55,172	50,903	40,520	-10,383	-20.4%
Delta	Cincinnati	CVG										-	-										-	-
Delta	Detroit	DTW		796			122	87	26	61		-61	-100.0%		89,289			14,414	9,881	2,829	6,710		-6,710	-100.0%
Delta	New York - LGA	LGA					4					-	-					596					-	-
Northwest	Detroit	DTW	1,609									-	-	194,058									-	-
Northwest	Minneapolis	MSP										-	-										-	-
Southwest	Baltimore	BWI	2,828	2,891	2,726	2,494	2,476	2,576	2,393	2,061	1,947	-113	-5.5%	387,397	393,093	387,879	364,979	363,524	383,914	353,543	306,438	286,174	-20,264	-6.6%
Southwest	Chicago Midway	MDW	706	1,144	1,010	984	948	996	922	896	822	-74	-8.3%	96,702	155,466	158,820	157,501	148,825	153,459	143,869	140,510	124,338	-16,172	-11.5%
Southwest	Denver	DEN			304							-	-			43,211							-	-
Southwest	Fort Lauderdale/Hollywood	FLL		9	90		4			4		-4	-100.0%		1,194	12,793		633			613		-613	-100.0%
Southwest	Kansas City	MCI	366									-	-	50,142									-	-
Southwest	Las Vegas	LAS		365	61	9	9					-	-		50,005	8,723	1,246	1,246					-	-
Southwest	Nashville	BNA	397									-	-	54,389									-	-
Southwest	Orlando	MCO	410	1,125	831	752	743	765	764	768	638	-130	-16.9%	56,111	154,145	123,873	109,202	113,888	118,422	115,387	121,091	100,116	-20,974	-17.3%
Southwest	Philadelphia	PHL		1,411								-	-		192,456								-	-
Southwest	Phoenix	PHX		322								-	-		44,114								-	-
Southwest	Tampa	TPA		782	466	470	479	487	461	470	439	-30	-6.4%		107,173	68,120	67,509	70,529	71,922	67,276	73,837	69,350	-4,486	-6.1%
United	Chicago O'Hare	ORD	1,403									-	-	221,523									-	-
United	Portland (ME)	PWM	57									-	-	7,241									-	-

Table F-5 Scheduled Passenger Operations by Market and Carrier for Manchester-Boston Regional Airport (Continued)

			Departures											Departing Seats										
Carrier	**Market**	**Code**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**
US Airways	Baltimore	BWI	1,782									-	-	191,078									-	-
US Airways	Charlotte	CLT		365								-	-		52,560								-	-
US Airways	Orlando	MCO	52									-	-	5,605									-	-
US Airways	Philadelphia	PHL	1,821	365	351							-	-	222,331	33,132	34,791							-	-
US Airways	Pittsburgh	PIT	1,085									-	-	139,837									-	-
US Airways	Washington National	DCA	675									-	-	82,085									-	-
Subtotal			**14,026**	**9,850**	**6,302**	**5,168**	**5,150**	**5,276**	**4,983**	**5,181**	**4,272**	**-910**	**-17.6%**	**1,821,657**	**1,311,677**	**907,518**	**768,905**	**767,200**	**791,810**	**744,750**	**755,753**	**638,505**	**-117,249**	**-15.5%**
Regional/ Commuter Carriers																								
Air Canada Express	Montreal Dorval	YUL										-	-										-	-
Air Canada Express	Toronto	YYZ	339	707								-	-	5,616	13,441								-	-
American Eagle	Charlotte	CLT				496	730	734	809	1,135	1,288	153	13.5%				37,761	54,688	60,890	67,927	85,018	92,149	7,131	8.4%
American Eagle	Chicago O'Hare	ORD									428	428	-									26,964	26,964	-
American Eagle	New York La Guardia	LGA	1,833									-	-	60,480									-	-
American Eagle	Philadelphia	PHL				2,295	2,237	2,090	2,066	1,420	1,759	339	23.9%				149,598	152,206	136,795	129,174	81,818	97,028	15,210	18.6%
American Eagle	Washington National	DCA				1,198	1,152	1,304	1,316	1,146	1,161	14	1.3%				77,065	74,008	85,620	84,908	80,357	80,532	175	0.2%
Boston-Maine Airways	Bangor	BGR										-	-										-	-
Boston-Maine Airways	Martha's Vineyard	MVY										-	-										-	-
Boston-Maine Airways	Nantucket	ACK										-	-										-	-
Boston-Maine Airways	New London/Groton	GON										-	-										-	-
Boston-Maine Airways	Portsmouth	PSM										-	-										-	-
Boston-Maine Airways	Saint John	YSJ										-	-										-	-
Continental Connection	Albany	ALB	80									-	-	1,515									-	-
Continental Connection	New York J F Kennedy	JFK										-	-										-	-

Table F-5 Scheduled Passenger Operations by Market and Carrier for Manchester-Boston Regional Airport (Continued)

			Departures											Departing Seats										
Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
Continental Connection	New York Newark	EWR		141								-	-		9,483								-	-
Continental Connection	Plattsburgh	PLB										-	-										-	-
Continental Connection	Rochester	ROC	44									-	-	841									-	-
Continental Connection	Syracuse	SYR	22									-	-	421									-	-
Continental Connection	Westchester County	HPN										-	-										-	-
Continental Express	Cleveland	CLE	593	1,178								-	-	29,614	58,921								-	-
Continental Express	New York Newark	EWR	1,028	1,267								-	-	64,944	63,336								-	-
Delta Connection	Atlanta	ATL	488	90	51	59						-	-	24,400	6,300	3,843	4,484						-	-
Delta Connection	Bangor	BGR	244									-	-	12,200									-	-
Delta Connection	Cincinnati	CVG	1,673									-	-	83,657									-	-
Delta Connection	Detroit	DTW		499	1,510	1,296	912	935	961	939	1,043	104	11.0%		32,795	75,507	69,261	51,960	60,782	69,124	68,596	75,566	6,970	10.2%
Delta Connection	New York J F Kennedy	JFK										-	-										-	-
Delta Connection	New York La Guardia	LGA	727		1,165	1,140	970	804	789	598	326	-272	-45.4%	36,357		66,132	63,202	55,968	49,250	48,605	35,805	18,350	-17,455	-48.7%
Delta Connection	Minneapolis	MSP										-	-										-	-
Independence Air	Washington Dulles	IAD										-	-										-	-
Northwest Airlink	Detroit	DTW										-	-										-	-
Northwest Airlink	Minneapolis	MSP										-	-										-	-
United Express	Chicago O'Hare	ORD		1,040	695	857	779	718	750	488		-488	-100.0%		67,675	39,114	49,854	42,976	39,887	39,041	24,400		-24,400	-100.0%
United Express	Cleveland	CLE			740	111						-	-			36,986	5,564						-	-
United Express	New York Newark	EWR			1,120	965	1,304	1,284	982	939	244	-694	-74.0%			54,604	44,824	60,052	59,682	49,324	47,773	13,226	-34,547	-72.3%
United Express	Washington Dulles	IAD		1,104	90						763	763	-		55,951	5,444						45,133	45,133	-
US Airways Express	Boston	BOS										-	-										-	-
US Airways Express	Charlotte	CLT		153	417							-	-		13,146	32,885							-	-

Table F-5 Scheduled Passenger Operations by Market and Carrier for Manchester-Boston Regional Airport (Continued)

			Departures											Departing Seats										
Carrier	**Market**	**Code**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**
US Airways Express	New York La Guardia	LGA	2,583	1,381								-	-	96,936	49,420								-	-
US Airways Express	Philadelphia	PHL		2,116	2,004							-	-		140,277	126,552							-	-
US Airways Express	Pittsburgh	PIT										-	-										-	-
US Airways Express	Washington National	DCA		1,039	1,252							-	-		81,095	84,499							-	-
Subtotal			**9,655**	**10,716**	**9,045**	**8,417**	**8,084**	**7,869**	**7,673**	**6,665**	**7,012**	**347**	**5.2%**	**416,980**	**591,840**	**525,567**	**501,613**	**491,858**	**492,906**	**488,103**	**423,766**	**448,948**	**25,182**	**5.9%**
Total			**23,681**	**20,566**	**15,347**	**13,585**	**13,234**	**13,145**	**12,656**	**11,846**	**11,283**	**-563**	**-4.7%**	**2,238,636**	**1,903,517**	**1,433,085**	**1,270,518**	**1,259,058**	**1,284,716**	**1,232,853**	**1,179,520**	**1,087,453**	**-92,067**	**-7.8%**

Source: OAG Schedules.
Notes: All Northwest Airlines operations included in Delta Air Lines from 2009 onwards (following 2008 merger).
All Continental Airlines operations included in United Airlines from 2011 onwards (following 2010 merger).
All AirTran Airways operations included in Southwest Airlines from 2012 onwards (following 2011 merger).
All US Airways operations included in American Airlines from 2014 onwards (following 2013 merger).

Table F-6 Scheduled Passenger Operations by Market and Carrier for Portland International Jetport

			Departures											Departing Seats										
Carrier	**Market**	**Code**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**
Jet Carriers																								
American	Charlotte	CLT				374	365	487	730	656	730	74	11.3%				46,341	45,504	62,336	93,963	86,100	97,818	11,718	13.6%
American	Philadelphia	PHL				92				537	410	-127	-23.7%				9,108				53,163	49,532	-3,631	-6.8%
American	Washington National	DCA					30	4	22			-	-					3,720	567	2,156			-	-
AirTran	Atlanta	ATL		92								-	-		10,764								-	-
AirTran	Baltimore	BWI		944								-	-		112,951								-	-
AirTran	Orlando	MCO		52								-	-		6,503								-	-
Cape Air	Boston	BOS									368	368	-									3,312	3,312	-
Continental	Cleveland	CLE										-	-										-	-
Continental	New York Newark	EWR										-	-										-	-
Delta	Atlanta	ATL	732	424	737	693	714	710	655	684	680	-4	-0.6%	103,944	60,167	109,750	103,571	107,000	106,660	99,378	107,560	104,422	-3,137	-2.9%
Delta	Cincinnati	CVG	1,089									-	-	154,658									-	-
Delta	Detroit	DTW						74	113	88	205	118	134.4%						8,124	12,446	9,633	22,581	12,949	134.4%
Delta	New York La Guardia	LGA			239	79	30				74	74	-			35,374	11,750	3,300				9,024	9,024	-
Frontier	Denver	DEN								61	87	26	42.3%								10,924	15,737	4,813	44.1%
Frontier	Fort Myers	RSW								13	61	47	360.9%								2,587	12,617	10,030	387.7%
Frontier	Orlando	MCO								83	174	91	109.7%								15,571	34,940	19,369	124.4%
Frontier	Raleigh/Durham	RDU								57	87	30	53.4%								10,260	15,737	5,477	53.4%
Frontier	Tampa	TPA								22	73	51	235.3%								3,934	13,191	9,257	235.3%
Independence Air	Washington Dulles	IAD										-	-										-	-
jetBlue	New York J F Kennedy	JFK		1,201	1,307	1,332	1,295	1,198	1,223	1,209	311	-898	-74.3%		128,936	130,671	133,200	130,314	119,800	122,286	121,136	31,086	-90,050	-74.3%
jetBlue	Orlando	MCO		212								-	-		21,214								-	-
Northwest	Detroit	DTW	523									-	-	52,105									-	-
Southwest	Baltimore	BWI			1,005	1,084	1,106	1,175	1,226	1,235	1,297	61	5.0%			136,588	152,939	158,358	168,423	183,430	184,326	188,717	4,391	2.4%
Southwest	Orlando	MCO				4	4	4	9	9		-9	-100.0%				633	633	633	1,246	1,246		-1,246	-100.0%
Southwest	Chicago Midway	MDW				9	9	9		22	17	-4	-20.3%				1,246	1,246	1,246		3,546	2,771	-775	-21.9%
Trans World Airlines	Hartford	BDL	305									-	-	43,310									-	-

Table F-6 Scheduled Passenger Operations by Market and Carrier for Portland International Jetport (Continued)

			Departures											Departing Seats										
Carrier	**Market**	**Code**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**
United	Chicago O'Hare	ORD	728					66		327	301	-26	-7.9%	88,996					8,066		44,205	38,151	-6,055	-13.7%
United	Denver	DEN									26	26	-									3,943	3,943	-
United	Manchester	MHT	366									-	-	53,802									-	-
United	New York Newark	EWR						9		313	162	-151	-48.2%						1,196		42,286	20,935	-21,351	-50.5%
United	Washington Dulles	IAD						18		171		-171	-100.0%						2,657		23,903		-23,903	-100.0%
US Airways	Charlotte	CLT		395	365							-	-		48,688	45,260							-	-
US Airways	Philadelphia	PHL	1,312									-	-	163,051									-	-
US Airways	Pittsburgh	PIT	1,081									-	-	137,472									-	-
US Airways	Washington National	DCA										-	-										-	-
Subtotal			**6,135**	**3,320**	**3,653**	**3,667**	**3,553**	**3,754**	**3,978**	**5,487**	**5,065**	**-422**	**-7.7%**	**797,338**	**389,224**	**457,644**	**458,788**	**450,075**	**479,708**	**514,905**	**720,381**	**664,514**	**-55,867**	**-7.8%**
Regional/ Commuter Carriers																								
Air Canada Express	Montreal Dorval	YUL	344									-	-	4,734									-	-
Air Canada Express	Toronto	YYZ		481	97							-	-		9,142	1,741							-	-
America West	New York Newark	EWR	52									-	-	2,457									-	-
American Eagle	Boston	BOS	3,804									-	-	125,518									-	-
American Eagle	Charlotte	CLT				26	143	243	61	165	73	-92	-55.6%				2,065	11,666	20,898	4,233	12,407	5,068	-7,339	-59.2%
American Eagle	Chicago O'Hare	ORD								244	297	53	21.8%								15,372	22,594	7,222	47.0%
American Eagle	New York La Guardia	LGA	2,033							546	582	37	6.8%	67,084							25,244	33,467	8,223	32.6%
American Eagle	Philadelphia	PHL				1,986	2,148	2,066	2,066	1,528	1,277	-251	-16.4%				125,325	141,789	120,072	118,721	86,532	78,745	-7,788	-9.0%
American Eagle	Washington National	DCA				1,426	1,613	1,707	1,724	1,635	1,721	86	5.2%				99,757	107,469	113,463	120,501	101,267	117,417	16,150	15.9%
Continental Connection	Albany	ALB										-	-										-	-
Continental Connection	Boston	BOS	204									-	-	3,871									-	-
Continental Connection	New York Newark	EWR		1,426								-	-		105,503								-	-
Continental Connection	Presque Isle	PQI										-	-										-	-
Continental Express	Cleveland	CLE	425	188								-	-	20,378	9,400								-	-
Continental Express	New York Newark	EWR	1,429	4								-	-	70,393	200								-	-

Table F-6 Scheduled Passenger Operations by Market and Carrier for Portland International Jetport (Continued)

			Departures											Departing Seats										
Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
Delta Connection	Atlanta	ATL		350								-	-		25,532								-	-
Delta Connection	Boston	BOS										-	-										-	-
Delta Connection	Cincinnati	CVG										-	-										-	-
Delta Connection	Detroit	DTW		1,217	1,249	1,061	896	840	817	838	738	-100	-11.9%		62,320	62,436	60,448	59,315	60,354	59,080	62,502	54,368	-8,134	-13.0%
Delta Connection	New York J F Kennedy	JFK		270						858	979	121	14.1%		13,500						63,700	61,579	-2,121	-3.3%
Delta Connection	New York La Guardia	LGA	475	786	1,202	1,231	1,284	1,332	1,561	1,332	1,061	-270	-20.3%	15,191	41,440	80,898	80,103	76,325	80,582	100,527	88,797	70,234	-18,563	-20.9%
Delta Connection	Minneapolis	MSP										-	-										-	-
Independence Air	Washington Dulles	IAD										-	-										-	-
Lufthansa German Airlines	Washington Dulles	IAD	31									-	-	1,550									-	-
Northwest Airlink	Detroit	DTW	484									-	-	33,366									-	-
Northwest Airlink	Minneapolis	MSP										-	-										-	-
Starlink Aviation	Yarmouth	YQI		521								-	-		9,386								-	-
Swissair	Boston	BOS	31									-	-	1,023									-	-
Ulendo Airlink	Bar Harbor	BHB						18				-	-						886				-	-
Ulendo Airlink	Halifax	YHZ							40			-	-							2,156			-	-
Ulendo Airlink	Islip	ISP						18				-	-						886				-	-
Ulendo Airlink	Melbourne	MLB						83	104	112	22	-90	-80.7%						5,173	5,237	5,600	1,079	-4,521	-80.7%
Ulendo Airlink	Sarasota/Bradenton	SRQ						17	104	130	74	-56	-43.0%						906	5,763	6,521	3,714	-2,807	-43.0%
Ulendo Airlink	Vero Beach	VRB								39	39	0	0.4%								1,964	1,971	7	0.4%
United Express	Chicago O'Hare	ORD		1,249	1,045	1,038	1,029	964		615	612	-3	-0.5%		82,273	65,872	63,099	64,054	53,558		32,506	36,374	3,868	11.9%
United Express	Cleveland	CLE			298							-	-			14,886							-	-
United Express	New York Newark	EWR			1,630	1,470	1,779	2,035		1,529	1,594	66	4.3%			102,156	92,953	108,900	113,044		81,721	83,131	1,410	1.7%
United Express	Washington Dulles	IAD	996	1,078	750	689	560	572		792	1,079	287	36.3%	49,779	64,767	39,624	37,949	35,213	35,764		43,504	62,337	18,833	43.3%

Table F-6 Scheduled Passenger Operations by Market and Carrier for Portland International Jetport (Continued)

			Departures											Departing Seats										
Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
US Airways Express	Bangor	BGR	231									-	-	8,558									-	-
US Airways Express	Boston	BOS	2,229									-	-	42,359									-	-
US Airways Express	Charlotte	CLT		88	35							-	-		5,323	2,777							-	-
US Airways Express	New York La Guardia	LGA	1,218	1,647								-	-	43,901	78,477								-	-
US Airways Express	Philadelphia	PHL		1,947	2,131							-	-		133,521	137,137							-	-
US Airways Express	Pittsburgh	PIT										-	-										-	-
US Airways Express	Plattsburgh	PLB	48									-	-	909									-	-
US Airways Express	Presque Isle	PQI										-	-										-	-
US Airways Express	Washington National	DCA	1,089	1,043	1,408							-	-	33,976	83,302	100,248							-	-
US Airways Express	Westchester County	HPN	65									-	-	1,235									-	-
Subtotal			**15,187**	**12,296**	**9,843**	**8,927**	**9,452**	**9,895**	**6,477**	**10,364**	**10,150**	**-214**	**-2.1%**	**526,282**	**724,086**	**607,775**	**561,699**	**604,731**	**605,586**	**416,218**	**627,639**	**632,078**	**4,440**	**0.7%**
Total			**21,322**	**15,615**	**13,496**	**12,594**	**13,005**	**13,649**	**10,455**	**15,851**	**15,215**	**-636**	**-4.0%**	**1,323,619**	**1,113,310**	**1,065,419**	**1,020,487**	**1,054,806**	**1,085,294**	**931,123**	**1,348,020**	**1,296,593**	**-51,427**	**-3.8%**

Source: OAG Schedules.
Notes: All Northwest Airlines operations included in Delta Air Lines from 2009 onwards (following 2008 merger).
All Continental Airlines operations included in United Airlines from 2011 onwards (following 2010 merger).
All AirTran Airways operations included in Southwest Airlines from 2012 onwards (following 2011 merger).
All US Airways operations included in American Airlines from 2014 onwards (following 2013 merger).

Table F-7 Scheduled Passenger Operations by Market and Carrier for Burlington International Airport

			Departures											Departing Seats										
Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
Jet Carriers																								
AirTran	Baltimore	BWI										-	-										-	-
Allegiant Air	Orlando/Sanford	SFB				94	104	95	18			-	-				15,873	17,880	16,452	3,065			-	-
American	Philadelphia	PHL				116				686		-686	-100.0%				11,470				67,872		-67,872	-100.0%
Continental	New York Newark	EWR										-	-										-	-
Delta	Atlanta	ATL			153	92	92	110	341	365	284	-81	-22.3%			21,394	13,708	13,708	15,202	38,852	45,507	35,086	-10,421	-22.9%
Frontier	Denver	DEN									92	92	-									16,509	16,509	-
Frontier	Orlando	MCO									48	48	-									8,589	8,589	-
jetBlue	New York J F Kennedy	JFK	244	1,434	1,365	1,244	1,156	1,182	1,189	1,160	1,095	-65	-5.6%	39,528	180,286	143,907	124,357	115,600	118,157	118,871	116,250	109,500	-6,750	-5.8%
jetBlue	Orlando	MCO		330								-	-		33,014								-	-
Northwest	Detroit	DTW										-	-										-	-
United	Chicago O'Hare	ORD	815				113	345	202	429	401	-29	-6.7%	105,509				13,777	45,877	27,228	60,402	51,273	-9,129	-15.1%
United	Denver	DEN									26	26	-									3,769	3,769	-
United	New York Newark	EWR								322	86	-236	-73.4%								47,394	11,453	-35,940	-75.8%
United	Portland (ME)	PWM										-	-										-	-
US Airways	Philadelphia	PHL	1,098		26							-	-	150,338		2,546							-	-
US Airways	Pittsburgh	PIT	732									-	-	103,568									-	-
US Airways	Washington National	DCA										-	-										-	-
Subtotal			**2,889**	**1,764**	**1,543**	**1,546**	**1,465**	**1,732**	**1,750**	**2,962**	**2,030**	**-932**	**-31.5%**	**398,943**	**213,300**	**167,847**	**165,408**	**160,965**	**195,688**	**188,016**	**337,424**	**236,178**	**-101,246**	**-30.0%**
Regional/ Commuter Carriers																								
America West	New York Newark	EWR	166									-	-	7,889									-	-
American Eagle	Boston	BOS	3,094									-	-	102,111									-	-
American Eagle	Charlotte	CLT					122	378	627	730	730	-						9,516	29,858	48,996	53,094	54,750	1,656	3.1%
American Eagle	Chicago O'Hare	ORD								244	240	-4	-1.8%								13,931	15,102	1,171	8.4%
American Eagle	New York La Guardia	LGA						18	21			-	-						886	1,064			-	-
American Eagle	Philadelphia	PHL				1,823	1,921	1,933	1,734	988	1,531	544	55.0%				110,129	126,772	103,725	103,662	58,638	91,729	33,092	56.4%
American Eagle	Washington National	DCA				1,276	1,339	1,394	1,386	1,151	1,082	-69	-6.0%				89,462	86,015	96,228	97,867	81,270	81,694	425	0.5%

Table F-7 Scheduled Passenger Operations by Market and Carrier for Burlington International Airport (Continued)

			Departures											Departing Seats										
Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
Continental Connection	Albany	ALB										-	-										-	-
Continental Connection	Boston	BOS	244									-	-	4,628									-	-
Continental Connection	Buffalo	BUF	4									-	-	84									-	-
Continental Connection	Hartford	BDL										-	-										-	-
Continental Connection	New York Newark	EWR		405								-	-		30,002								-	-
Continental Connection	Plattsburgh	PLB	213									-	-	4,039									-	-
Continental Connection	Plattsburgh International	PBG										-	-										-	-
Continental Connection	Poughkeepsie	POU	66									-	-	1,262									-	-
Continental Connection	Washington Dulles	IAD										-	-										-	-
Continental Connection	Westchester County	HPN										-	-										-	-
Continental Express	Cleveland	CLE	322	366								-	-	16,064	18,286								-	-
Continental Express	New York Newark	EWR	1,458	1,020								-	-	70,203	51,000								-	-
Continental Express	Westchester County	HPN										-	-										-	-
Delta Connection	Atlanta	ATL			61	273	273	255	59	31	142	111	359.4%			4,636	20,701	20,748	19,369	4,484	2,356	10,825	8,469	359.4%
Delta Connection	Boston	BOS										-	-										-	-
Delta Connection	Cincinnati	CVG										-	-										-	-
Delta Connection	Detroit	DTW		1,227	1,223	1,201	1,004	1,005	1,000	1,013	1,092	79	7.8%		61,417	61,224	60,043	57,053	55,842	51,402	55,441	63,857	8,415	15.2%
Delta Connection	New York J F Kennedy	JFK		1,336						612	1,036	424	69.3%		67,071						45,706	59,240	13,534	29.6%
Delta Connection	New York La Guardia	LGA	355		1,279	1,248	1,257	1,151	1,073	1,000	759	-241	-24.1%	11,351		83,899	82,592	76,339	69,396	60,573	58,113	49,916	-8,197	-14.1%
Independence Air	Washington Dulles	IAD										-	-										-	-
Lufthansa German Airlines	Washington Dulles	IAD	31									-	-	1,550									-	-
Northwest Airlink	Detroit	DTW										-	-										-	-
Northwest Airlink	Minneapolis	MSP										-	-										-	-
Porter Airlines	Toronto Island Apt	YTZ			56	47	39	22	26	26		-26	-100.0%			3,910	3,308	2,886	1,607	1,903	1,903		-1,903	-100.0%

Table F-7 Scheduled Passenger Operations by Market and Carrier for Burlington International Airport (Continued)

			Departures											Departing Seats										
Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
Swissair	Boston	BOS	31									-	-	1,023									-	-
United Express	Chicago O'Hare	ORD		1,353	1,396	1,402	1,144	794	895	706	814	108	15.3%		84,431	84,669	85,350	63,845	42,348	50,322	35,279	43,814	8,536	24.2%
United Express	Cleveland	CLE			409	73						-	-			20,464	3,636						-	-
United Express	New York Newark	EWR			1,456	1,281	1,569	1,705	1,710	1,388	1,507	119	8.6%			85,373	82,670	96,340	94,246	89,273	72,093	81,616	9,523	13.2%
United Express	Washington Dulles	IAD	1,477	1,130	910	892	738	795	815	1,062	1,156	94	8.9%	73,843	61,988	48,930	50,633	41,127	48,150	47,274	66,445	72,344	5,899	8.9%
US Airways Express	Boston	BOS	2,404									-	-	48,139									-	-
US Airways Express	Charlotte	CLT										-	-										-	-
US Airways Express	New York La Guardia	LGA	2,074	1,680								-	-	76,749	62,144								-	-
US Airways Express	Philadelphia	PHL		1,903	1,803							-	-		128,140	111,615							-	-
US Airways Express	Pittsburgh	PIT										-	-										-	-
US Airways Express	Plattsburgh	PLB	2,427									-	-	46,116									-	-
US Airways Express	Poughkeepsie	POU	718									-	-	13,639									-	-
US Airways Express	Saranac Lake	SLK	44									-	-	841									-	-
US Airways Express	Washington National	DCA	988	1,043	1,347							-	-	31,574	77,625	100,348							-	-
US Airways Express	Wilkes-Barre Scranton	AVP	22									-	-	415									-	-
Subtotal			**16,138**	**11,461**	**9,941**	**9,516**	**9,405**	**9,450**	**9,346**	**8,950**	**10,089**	**1,140**	**12.7%**	**511,521**	**642,104**	**605,069**	**588,524**	**580,640**	**561,655**	**556,820**	**544,268**	**624,887**	**80,619**	**14.8%**
Total			**19,028**	**13,225**	**11,484**	**11,062**	**10,870**	**11,182**	**11,096**	**11,912**	**12,120**	**208**	**1.7%**	**910,464**	**855,404**	**772,916**	**753,932**	**741,605**	**757,343**	**744,836**	**881,692**	**861,065**	**-20,627**	**-2.3%**

Source: OAG Schedules.

Notes: Allegiant stopped reporting to the OAG in 2009, so Allegiant 2009-2016 statistics from the T100 database; 2017-2019 statistics from OAG, which recommenced reporting.
All Northwest Airlines operations included in Delta Air Lines from 2009 onwards (following 2008 merger).
All Continental Airlines operations included in United Airlines from 2011 onwards (following 2010 merger).
All AirTran Airways operations included in Southwest Airlines from 2012 onwards (following 2011 merger).
All US Airways operations included in American Airlines from 2014 onwards (following 2013 merger).

Table F-8 Scheduled Passenger Operations by Market and Carrier for Bangor International Airport

			Departures											Departing Seats										
Carrier	**Market**	**Code**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**
Jet Carriers																								
Allegiant Airways	Orlando/Sanford	SFB		181	165	153	180	182	184	144	209	65	45.3%		27,150	27,335	26,536	31,156	31,730	31,221	24,218	34,512	10,294	42.5%
Allegiant Airways	Punta Gorda	PGD				33						-	-				5,478						-	-
Allegiant Airways	St. Petersburg/Clearwater	PIE		107	115	119	134	143	136	118	165	47	40.2%		16,050	19,090	20,501	23,531	25,201	23,926	20,424	27,619	7,195	35.2%
Delta	Detroit	DTW					175	180				-	-					19,334	19,769				-	-
Delta	New York J F Kennedy	JFK							74	79		-79	-100.0%							8,171	8,674		-8,674	-100.0%
Pan American Airways	Allentown/Bethlehem	ABE										-	-										-	-
Pan American Airways	Baltimore	BWI										-	-										-	-
Pan American Airways	Pittsburgh	PIT	285									-	-	42,729									-	-
Pan American Airways	Portsmouth	PSM	389									-	-	58,414									-	-
Pan American Airways	Sanford	SFB										-	-										-	-
United	Chicago O'Hare	ORD								13	17	4	32.6%								1,682	2,231	549	32.6%
Subtotal			**674**	**288**	**280**	**305**	**489**	**505**	**394**	**354**	**392**	**38**	**10.7%**	**101,143**	**43,200**	**46,425**	**52,515**	**74,021**	**76,700**	**63,318**	**54,998**	**64,362**	**9,363**	**17.0%**
Regional/ Commuter Carriers																								
American Eagle	Boston	BOS	4,670									-	-	154,115									-	-
American Eagle	Charlotte	CLT							13	153	210	57	37.1%							828	9,639	15,729	6,090	63.2%
American Eagle	Chicago O'Hare	ORD								22	148	126	578.4%								1,377	9,400	8,023	582.6%
American Eagle	New York La Guardia	LGA	382					35	44	214	210	-4	-1.8%	12,606					1,757	3,322	9,422	9,253	-170	-1.8%
American Eagle	Philadelphia	PHL				1,496	1,452	1,447	1,551	1,504	1,579	75	5.0%				94,849	91,163	85,549	84,057	95,487	83,467	-12,020	-12.6%
American Eagle	Washington National	DCA				791	771	900	952	1,009	984	-25	-2.5%				41,033	40,260	47,737	60,581	60,159	55,962	-4,197	-7.0%
Boston-Maine Airways	Halifax	YHZ										-	-										-	-
Boston-Maine Airways	Manchester	MHT										-	-										-	-
Boston-Maine Airways	Portsmouth	PSM										-	-										-	-
Boston-Maine Airways	Saint John	YSJ										-	-										-	-

Table F-8 Scheduled Passenger Operations by Market and Carrier for Bangor International Airport (Continued)

			Departures											Departing Seats										
Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
Continental Connection	Albany	ALB										-	-										-	-
Continental Express	New York Newark	EWR										-	-										-	-
Delta Connection	Atlanta	ATL										-	-										-	-
Delta Connection	Boston	BOS										-	-										-	-
Delta Connection	Cincinnati	CVG	1,342									-	-	67,100									-	-
Delta Connection	Detroit	DTW		975	706	711	279	204			9	9	-		50,540	46,371	47,269	19,614	14,863			662	662	-
Delta Connection	New York J F Kennedy	JFK		180					354	408		-408	-100.0%		9,000					26,882	31,019		-31,019	-100.0%
Delta Connection	New York La Guardia	LGA		537	1,153	975	976	1,007	1,008	1,008	1,192	184	18.2%		26,958	71,955	59,239	57,025	58,761	60,323	59,863	62,269	2,406	4.0%
Delta Connection	Minneapolis	MSP										-	-										-	-
Northwest Airlink	Boston	BOS	27									-	-	797									-	-
Northwest Airlink	Detroit	DTW										-	-										-	-
Northwest Airlink	Minneapolis	MSP										-	-										-	-
Pan American Airways	Portsmouth	PSM										-	-										-	-
Pan American Airways	Saint John	YSJ										-	-										-	-
United Express	Chicago O'Hare	ORD				245	215	206	280	310	306	-4	-1.4%				16,170	14,190	13,624	19,682	21,720	21,420	-300	-1.4%
United Express	New York Newark	EWR						123	490	730	870	140	19.2%						6,150	26,444	39,540	44,370	4,830	12.2%
US Airways Express	Boston	BOS	1,942									-	-	36,906									-	-
US Airways Express	New York La Guardia	LGA	35	1,017								-	-	1,295	44,051								-	-
US Airways Express	Philadelphia	PHL	428	1,156	1,564							-	-	15,836	68,510	101,167							-	-
US Airways Express	Pittsburgh	PIT										-	-										-	-
US Airways Express	Portland (ME)	PWM	231									-	-	8,558									-	-
US Airways Express	Presque Isle	PQI	299									-	-	6,224									-	-
US Airways Express	Washington National	DCA		31	883							-	-		1,529	47,981							-	-
Subtotal			**9,357**	**3,896**	**4,307**	**4,218**	**3,693**	**3,922**	**4,692**	**5,359**	**5,508**	**149**	**2.8%**	**303,436**	**200,587**	**267,474**	**258,560**	**222,252**	**228,441**	**282,119**	**328,226**	**302,531**	**-25,695**	**-7.8%**
Total			**10,031**	**4,184**	**4,587**	**4,523**	**4,182**	**4,427**	**5,086**	**5,713**	**5,900**	**187**	**3.3%**	**404,579**	**243,787**	**313,899**	**311,075**	**296,273**	**305,141**	**345,437**	**383,225**	**366,893**	**-16,332**	**-4.3%**

Source: OAG Schedules.

Notes: Allegiant stopped reporting to the OAG in 2009, Allegiant 2009-2016 statistics from the T100 database; 2017-2019 statistics from OAG, which recommenced reporting.
All Northwest Airlines operations included in Delta Air Lines from 2009 onwards (following 2008 merger).
All Continental Airlines operations included in United Airlines from 2011 onwards (following 2010 merger).
All AirTran Airways operations included in Southwest Airlines from 2012 onwards (following 2011 merger).
All US Airways operations included in American Airlines from 2014 onwards (following 2013 merger).

Table F-9 Scheduled Passenger Operations by Market and Carrier for Tweed-New Haven Airport

Departures

Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
Regional/ Commuter Carriers													
American Eagle	Philadelphia	PHL				1,356	1,222	1,121	1,021	1,034	1,036	2	0.2%
American Eagle	Charlotte	CLT									52	52	-
Delta Connection	Cincinnati	CVG										-	-
Boston-Maine Airways	Baltimore	BWI										-	-
Boston-Maine Airways	Bedford	BED										-	-
Boston-Maine Airways	Elmira/Corning	ELM										-	-
Boston-Maine Airways	Portsmouth	PSM										-	-
Southern Airways Express	Nantucket	ACK									39	39	-
US Airways Express	Philadelphia	PHL	1,773	1,608	1,399							-	-
US Airways Express	Washington National	DCA	937									-	-
Total		**2,710**	**2,929**	**1,222**	**1,399**	**1,356**	**1,121**	**1,021**	**1,034**	**1,128**	**93**	**9.0%**	**2,710**

Departing Seats

Carrier	Market	Code	2000	2010	2013	2014	2015	2016	2017	2018	2019	'18-'19 Change	'18-'19 Pct. Change
Regional/ Commuter Carriers													
American Eagle	Philadelphia	PHL				50,161	49,657	63,913	53,712	51,707	67,725	16,018	31.0%
American Eagle	Charlotte	CLT									3,402	3,402	-
Delta Connection	Cincinnati	CVG										-	-
Boston-Maine Airways	Baltimore	BWI										-	-
Boston-Maine Airways	Bedford	BED										-	-
Boston-Maine Airways	Elmira/Corning	ELM										-	-
Boston-Maine Airways	Portsmouth	PSM										-	-
Southern Airways Express	Nantucket	ACK									355	355	-
US Airways Express	Philadelphia	PHL	65,612	59,491	51,768							-	-
US Airways Express	Washington National	DCA	34,658									-	-
Total			**100,270**	**59,491**	**51,768**	**50,161**	**49,657**	**63,913**	**53,712**	**51,707**	**71,482**	**19,775**	**38.2%**

Source: OAG Schedules.
Notes: All Northwest Airlines operations included in Delta Air Lines from 2009 onwards (following 2008 merger).
All Continental Airlines operations included in United Airlines from 2011 onwards (following 2010 merger).
All AirTran Airways operations included in Southwest Airlines from 2012 onwards (following 2011 merger).
All US Airways operations included in American Airlines from 2014 onwards (following 2013 merger).

Table F-10 Scheduled Passenger Operations by Market and Carrier for Worcester Regional Airport

			Departures											Departing Seats										
Carrier	**Market**	**Code**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**
Jet Carriers																								
Allegiant Airways	Sanford	SFB										-	-										-	-
Boston-Maine Airways	Allentown/Bethlehem	ABE										-	-										-	-
Boston-Maine Airways	Portsmouth	PSM										-	-										-	-
Boston-Maine Airways	Sanford	SFB										-	-										-	-
Direct Air	Myrtle Beach	MYR		73								-	-		9,782								-	-
Direct Air	Orlando/Sanford	SFB		144								-	-		21,937								-	-
Direct Air	Punta Gorda	PGD		94								-	-		14,541								-	-
Direct Air	West Palm Beach	PBI		13								-	-		1,872								-	-
jetBlue	Fort Lauderdale/Hollywood	FLL			61	365	365	365	365	365	365	-				6,100	36,500	36,500	36,500	36,500	36,500	36,500	-	
jetBlue	New York J F Kennedy	JFK								245	365	120	49.0%								24,500	36,500	12,000	49.0%
jetBlue	Orlando	MCO			61	365	365	365	365	365	365	-				6,100	36,500	36,500	36,500	36,500	36,500	36,500	-	
Subtotal				**324**	**122**	**730**	**730**	**730**	**730**	**975**	**1,095**	**120**	**12.3%**		**48,132**	**12,200**	**73,000**	**73,000**	**73,000**	**73,000**	**97,500**	**109,500**	**12,000**	**12.3%**
Regional/ Commuter Carriers																								
American Eagle	Chicago O'Hare	ORD										-	-										-	-
American Eagle	New York J F Kennedy	JFK	552									-	-	18,216									-	-
American Eagle	Philadelphia	PHL								184	494	310	168.6%								9,200	24,714	15,514	168.6%
Delta Connection	Atlanta	ATL	670									-	-	33,500									-	-
Delta Connection	Detroit	DTW									153	153	-									7,650	7,650	-
US Airways Express	Philadelphia	PHL	1,464									-	-	54,168									-	-
Subtotal			**2,686**							**184**	**647**	**463**	**251.8%**	**105,884**							**9,200**	**32,364**	**23,164**	**251.8%**
Total			**2,686**	**324**	**122**	**730**	**730**	**730**	**730**	**1,159**	**1,742**	**583**	**50.3%**	**105,884**	**48,132**	**12,200**	**73,000**	**73,000**	**73,000**	**73,000**	**106,700**	**141,864**	**35,164**	**33.0%**

Source: OAG Schedules.
Notes: All Northwest Airlines operations included in Delta Air Lines from 2009 onwards (following 2008 merger).
All Continental Airlines operations included in United Airlines from 2011 onwards (following 2010 merger).
All AirTran Airways operations included in Southwest Airlines from 2012 onwards (following 2011 merger).
All US Airways operations included in American Airlines from 2014 onwards (following 2013 merger).

Table F-11 Scheduled Passenger Operations by Market and Carrier for Hanscom Field

			Departures											Departing Seats										
Carrier	**Market**	**Code**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**
Regional/ Commuter Carriers																								
Boston-Maine Airways	Elmira/Corning	ELM										-	-										-	-
Boston-Maine Airways	Hyannis	HYA										-	-										-	-
Boston-Maine Airways	Manchester	MHT										-	-										-	-
Boston-Maine Airways	Martha's Vineyard	MVY										-	-										-	-
Boston-Maine Airways	Nantucket	ACK										-	-										-	-
Boston-Maine Airways	New Haven	HVN										-	-										-	-
Boston-Maine Airways	New London/Groton	GON										-	-										-	-
Boston-Maine Airways	Portsmouth	PSM										-	-										-	-
Boston-Maine Airways	Trenton	TTN										-	-										-	-
Pan American Airways	Atlantic City Pomona Field	ACY										-	-										-	-
Pan American Airways	Martha's Vineyard	MVY										-	-										-	-
Pan American Airways	New York Newark	EWR										-	-										-	-
Pan American Airways	Portsmouth	PSM										-	-										-	-
Pan American Airways	Westchester County	HPN										-	-										-	-
Shuttle America	Buffalo	BUF	1,119									-	-	55,950									-	-
Shuttle America	Hartford	BDL	173									-	-	8,636									-	-
Shuttle America	New York La Guardia	LGA	523									-	-	26,143									-	-
Shuttle America	Trenton	TTN	2,062									-	-	103,093									-	-
Streamline	Trenton	TTN										-	-										-	-
US Airways	Martha's Vineyard	MVY										-	-										-	-
US Airways	Nantucket	ACK										-	-										-	-
US Airways	New York La Guardia	LGA										-	-										-	-
US Airways	Philadelphia	PHL										-	-										-	-
US Airways	Trenton	TTN										-	-										-	-
US Airways	Westchester County	HPN										-	-										-	-
Total			**3,876**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**-**	**-**	**193,821**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**-**	**-**

Source: OAG Schedules.
Notes: All US Airways operations included in American Airlines from 2014 onwards (following 2013 merger).
Last scheduled flight based on OAG schedules was flown in 2011 on Streamline Air (a subsidiary of Charter Air Transport – based at Hanscom Field) to Trenton, NJ

Table F-12 Scheduled Passenger Operations by Market and Carrier for Portsmouth International Airport

			Departures											Departing Seats										
Carrier	**Market**	**Code**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**	**2000**	**2010**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**'18-'19 Change**	**'18-'19 Pct. Change**
Jet Carriers																								
Allegiant Airways	Fort Lauderdale/Hollywood	FLL					27	43	35			-	-					4,779	7,611	6,177			-	-
Allegiant Airways	Orlando/Sanford	SFB			16	83	95	100	135	109	135	26	23.7%			2,656	14,242	16,111	17,062	22,498	18,500	22,062	3,562	19.3%
Allegiant Airways	Punta Gorda	PGD				22	35	48	99	83	144	61	73.0%				3,652	5,909	8,496	17,496	14,691	25,412	10,721	73.0%
Allegiant Airways	Savannah	SAV									26	26	-									4,653	4,653	-
Allegiant Airways	St. Petersburg/Clearwater	PIE						13	39			-	-						2,158	6,474			-	-
Allegiant Airways	Myrtle Beach	MYR							34	26	26	-								5,644	4,653	4,653	-	
Boston-Maine Airways	Fort Lauderdale/Hollywood	FLL										-	-										-	-
Boston-Maine Airways	Hartford	BDL										-	-										-	-
Boston-Maine Airways	Newburgh	SWF										-	-										-	-
Boston-Maine Airways	Sanford	SFB										-	-										-	-
Frontier	Orlando	MCO								13	78	64	483.9%								2,391	15,913	13,521	565.4%
Pan American Airways	Allentown/Bethlehem	ABE	93									-	-	13,950									-	-
Pan American Airways	Bangor	BGR	389									-	-	58,414									-	-
Pan American Airways	Gary	GYY	51									-	-	7,714									-	-
Pan American Airways	Manchester	MHT										-	-										-	-
Pan American Airways	New York Newark	EWR										-	-										-	-
Pan American Airways	Pittsburgh	PIT	261									-	-	39,171									-	-
Pan American Airways	Sanford	SFB	296									-	-	44,400									-	-
Pan American Airways	Santo Domingo	SDQ										-	-										-	-
Pan American Airways	St. Petersburg/Clearwater	PIE										-	-										-	-
Pan American Airways	Worcester	ORH										-	-										-	-
Skybus	Columbus	CMH										-	-										-	-
Skybus	Greensboro	GSO										-	-										-	-
Skybus	Punta Gorda	PGD										-	-										-	-
Skybus	Saint Augustine	UST										-	-										-	-
Subtotal			**1,091**	**0**	**16**	**105**	**157**	**204**	**342**	**232**	**409**	**177**	**76.4%**	**163,650**	**0**	**2,656**	**17,894**	**26,799**	**35,327**	**58,289**	**40,235**	**72,692**	**32,458**	**80.7%**

Table F-12 Scheduled Passenger Operations by Market and Carrier for Portsmouth International Airport (Continued)

Carrier	Market	Code	Departures 2000	Departures 2010	Departures 2013	Departures 2014	Departures 2015	Departures 2016	Departures 2017	Departures 2018	Departures 2019	Departures '18-'19 Change	Departures '18-'19 Pct. Change	Departing Seats 2000	Departing Seats 2010	Departing Seats 2013	Departing Seats 2014	Departing Seats 2015	Departing Seats 2016	Departing Seats 2017	Departing Seats 2018	Departing Seats 2019	Departing Seats '18-'19 Change	Departing Seats '18-'19 Pct. Change
Regional/ Commuter Carriers																								
Boston-Maine Airways	Baltimore	BWI										-	-										-	-
Boston-Maine Airways	Bangor	BGR										-	-										-	-
Boston-Maine Airways	Bedford	BED										-	-										-	-
Boston-Maine Airways	Hyannis	HYA										-	-										-	-
Boston-Maine Airways	Manchester	MHT										-	-										-	-
Boston-Maine Airways	Martha's Vineyard	MVY										-	-										-	-
Boston-Maine Airways	Nantucket	ACK										-	-										-	-
Boston-Maine Airways	New Haven	HVN										-	-										-	-
Boston-Maine Airways	New London/Groton	GON										-	-										-	-
Boston-Maine Airways	Saint John	YSJ										-	-										-	-
Boston-Maine Airways	Trenton	TTN										-	-										-	-
Boston-Maine Airways	Westchester County	HPN										-	-										-	-
Pan American Airways	Atlantic City Pomona Field	ACY										-	-										-	-
Pan American Airways	Baltimore	BWI										-	-										-	-
Pan American Airways	Bangor	BGR										-	-										-	-
Pan American Airways	Bedford	BED										-	-										-	-
Pan American Airways	Martha's Vineyard	MVY										-	-										-	-
Pan American Airways	Saint John	YSJ										-	-										-	-
Subtotal												**-**	**-**										**-**	**-**
Total			**1,091**	**0**	**0**	**0**	**157**	**204**	**342**	**232**	**409**	**177**	**76.4%**	**163,650**	**0**	**0**	**0**	**26,799**	**35,327**	**58,289**	**40,235**	**72,692**	**32,458**	**80.7%**

Source: OAG Schedules.

Notes: Allegiant stopped reporting to the OAG in 2009, Allegiant 2009-2016 statistics from the T100 database; 2017-2019 statistics from OAG, which recommenced reporting..

All Northwest Airlines operations included in Delta Air Lines from 2009 onwards (following 2008 merger).

All Continental Airlines operations included in United Airlines from 2011 onwards (following 2010 merger).

All AirTran Airways operations included in Southwest Airlines from 2012 onwards (following 2011 merger).

All US Airways operations included in American Airlines from 2014 onwards (following 2013 merger).

G

Ground Access to and from Logan Airport

This appendix provides information in support of Chapter 5, *Ground Access to and from Logan Airport*:

- Table G-1A Logan Express Bus Service Ridership (Annual)
- Table G-1B Logan Express Back Bay Service Ridership (Annual)
- Table G-2 Water Transportation Services Ridership to and from Logan Airport (Annual)
- Table G-3 Massachusetts Bay Transportation Authority (MBTA) Airport Station Passengers
- Table G-4 Annual Taxi Dispatches (Tickets Sold)
- Table G-5A On-Airport Commercial Parking Rates, 2010-2019 (Terminal Area Facilities)
- Table G-5B On-Airport Commercial Parking Rates, 2010-2019 (Economy Parking)
- Table G-6 Logan Airport Employee Parking Supply
- Table G-7 Logan Airport Commercial Parking Supply
- Table G-8 2018 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment, and Vehicle Miles Traveled (VMT) Summary
- Table G-9 2019 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment, and Vehicle Miles Traveled (VMT) Summary
- Volumetric Model Traffic Roadway Network
- March 2018 Logan Airport Parking Space Inventory, submitted to Massachusetts Department of Environmental Protection (also known as the *Parking Freeze Report*)
- September 2018 Logan Airport Parking Space Inventory, submitted to Massachusetts Department of Environmental Protection (also known as the *Parking Freeze Report*)
- March 2019 Logan Airport Parking Space Inventory, submitted to Massachusetts Department of Environmental Protection (also known as the *Parking Freeze Report*)
- September 2019 Logan Airport Parking Space Inventory, submitted to Massachusetts Department of Environmental Protection (also known as the *Parking Freeze Report*)

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Table G-1A Logan Express Bus Service Ridership

	Ridership			Percent Change		
Service Year	**Air Passengers**	**Employees**	**Total**	**Air Passengers**	**Employees**	**Total**
Framingham						
1992	207,847	7,573	215,420	4.3%	21.3%	4.8%
1993	229,064	12,307	241,371	10.2%	62.5%	12.0%
1994	250,342	17,352	267,694	9.3%	41.0%	10.9%
1995	274,754	21,129	295,883	9.8%	21.8%	10.5%
1996	325,665	22,932	348,597	18.5%	8.5%	17.8%
1997	316,306	29,871	346,175	(2.9%)	30.3%	(0.7%)
1998	337,007	33,971	370,978	6.5%	13.7%	7.2%
1999	345,715	31,946	380,661	3.5%	(6.0%)	2.6%
2000	371,560	34,508	406,068	6.6%	8.0%	6.7%
2001	354,521	38,740	393,261	(4.6%)	12.3%	(3.2%)
2002	342,746	42,441	385,187	(3.3%)	8.7%	(2.1%)
2003	310,024	55,979	366,003	(9.5%)	31.9%	(5.0%)
2004	323,931	54,763	378,694	4.5%	(2.2%)	3.5%
2005	318,125	57,569	375,694	(1.8%)	5.1%	(0.8%)
2006	349,022	60,764	409,789	9.7%	5.5%	9.1%
2007	311,299	57,252	368,551	(2.1%)[5]	(0.6%)[5]	(1.9%)[5]
2008	276,112	57,797	333,909	(11.3%)	1.0%	(9.4%)
2009	264,233	59,840	324,073	(4.3%)	3.5%	(2.9%)
2010	272,190	62,226	334,416	3.0%	4.0%	3.2%
2011[1]	272,301	68,228	340,529	0.0%	9.6%	1.8%
2012	279,603	82,951	362,554	2.7%	21.6%	6.5%
2013	295,654	84,008	379,662	5.7%	1.3%	4.7%
2014	303,646	87,488	391,134	2.7%	4.1%	3.0%
2015	345,680	82,943	428,623	13.8%	(5.2%)	9.6%
2016	406,253	92,642	498,895	17.5%	11.7%	16.4%
2017	434,906	99,639	534,545	7.1%	7.6%	7.2%
2018	**463,377**	**114,151**	**577,528**	**6.5%**	**14.6%**	**8.0%**
2019	**486,507**	**129,704**	**616,211**	**5.0%**	**13.6%**	**6.7%**

Table G-1A	Logan Express Bus Service Ridership (Continued)					
	Ridership			Percent Change		
Service Year	**Air Passengers**	**Employees**	**Total**	**Air Passengers**	**Employees**	**Total**
Braintree						
1992	186,217	9,694	195,911	10.6%	16.6%	10.8%
1993	205,209	22,768	227,977	10.2%	134.9%	16.4%
1994	247,636	37,489	285,125	20.7%	64.7%	25.1%
1995	264,579	70,723	335,302	6.8%	88.7%	17.6%
1996	335,232	103,519	438,751	26.7%	46.4%	30.1%
1997	300,006	135,340	435,346	(10.5%)	30.7%	(0.8%)
1998	300,005	156,105	456,110	0.0%	15.3%	4.8%
1999	328,818	125,286	454,105	9.6%	(19.7%)	(0.5%)
2000	355,932	149,687	505,619	8.2%	19.5%	11.3%
2001	345,249	156,240	501,489	(3.0%)	4.4%	(0.8%)
2002	323,115	190,360	513,475	(6.4%)	21.8%	2.4%
2003	301,013	216,765	517,778	(6.8%)	13.9%	0.8%
2004	318,100	208,566	526,666	5.7%	(3.8%)	1.7%
2005	307,659	189,531	497,190	(3.2%)	(9.1%)	(5.5%)
2006	333,413	202,983	536,396	8.4%	7.1%	7.9%
2007	300,715	196,955	497,670	(2.3%)5	3.9%[5]	0.1%[5]
2008	252,289	221,591	473,880	(16.1%)	12.5%	(4.8%)
2009	231,151	234,908	466,059	(8.4%)	6.0%	(1.7%)
2010	231,422	251,443	482,865	0.1%	7.0%	3.6%
2011[1]	233,521	285,515	519,036	0.9%	13.6%	7.5%
2012	247,346	314,542	561,888	5.9%	10.2%	8.3%
2013	268,154	320,329	588,483	8.4%	1.8%	4.7%
2014	296,975	313,334	610,309	10.7%	(2.2%)	3.7%
2015	313,576	311,695	625,271	5.6%	(0.5%)	2.5%
2016	329,043	326,115	655,158	4.9%	4.6%	4.8%
2017	345,401	349,435	694,836	5.0%	7.2%	6.1%
2018	**370,654**	**371,813**	**742,467**	**7.3%**	**6.4%**	**6.9%**
2019	**407,090**	**413,405**	**820,495**	**9.8%**	**11.2%**	**10.5%**

Table G-1A Logan Express Bus Service Ridership (Continued)

	Ridership			Percent Change		
Service Year	**Air Passengers**	**Employees**	**Total**	**Air Passengers**	**Employees**	**Total**
Woburn[2]						
1992[3]	3,052	91	3,143	NA	NA	-
1993	59,635	5,027	64,662	NA	NA	-
1994	119,567	9,082	128,649	100.5%	80.7%	99.0%
1995	150,147	13,376	163,523	25.6%	47.3%	27.1%
1996	190,566	17,322	207,888	26.9%	29.5%	27.1%
1997	199,715	20,018	219,733	4.8%	15.6%	5.7%
1998	208,286	22,876	231,162	4.3%	14.3%	5.2%
1999	191,454	23,495	214,949	(8.1%)	2.7%	(7.0%)
2000	195,744	27,522	223,266	2.2%	17.1%	3.9%
2001	177,375	38,318	215,530	(9.4%)	39.2%	(3.4%)
2002	161,145	73,277	234,422	(9.2%)	91.0%	8.7%
2003	164,980	103,963	268,943	(2.4%)	41.9%	14.7%
2004	172,110	111,326	283,436	4.3%	7.1%	5.4%
2005	163,227	110,961	274,188	(5.1%)	(0.3%)	(3.2%)
2006	167,341	121,672	289,013	2.5%	9.7%	5.4%
2007	149,149	123,066	272,215	(8.6%)[5]	10.9%[5]	(0.7%)[5]
2008	129,385	122,777	252,162	(13.3%)	(0.2%)	(7.4%)
2009	113,607	121,633	235,240	(12.2%)	(0.9%)	(6.7%)
2010	115,257	127,120	242,377	1.5%	4.5%	3.0%
2011[1]	118,232	151,029	269,261	2.6%	18.8%	11.1%
2012	126,549	188,747	315,296	7.0%	25.0%	17.1%
2013	140,407	192,289	332,696	11.0%	1.9%	5.5%
2014	156,045	194,341	350,386	11.1%	1.1%	5.3%
2015	163,469	191,242	354,711	4.8%	(1.6%)	1.2%
2016	170,704	197,568	368,272	4.4%	3.3%	3.8%
2017	176,485	209,194	385,679	3.4%	5.9%	4.7%
2018	**178,398**	**226,698**	**405,096**	**1.1%**	**8.4%**	**5.0%**
2019	**184,031**	**240,047**	**424,078**	**3.2%**	**5.9%**	**4.7%**

Table G-1A Logan Express Bus Service Ridership (Continued)

	Ridership			Percent Change		
Service Year	**Air Passengers**	**Employees**	**Total**	**Air Passengers**	**Employees**	**Total**
Peabody						
2001[4]	8,151	3,097	11,248	NA	NA	NA
2002	28,626	20,629	49,255	NA	NA	NA
2003	32,318	23,425	55,743	21.4%	13.6%	13.2%
2004	43,389	33,642	77,031	34.3%	43.6%	38.2%
2005	51,023	39,599	87,622	17.6%	17.7%	13.7%
2006	42,142	32,632	74,774	(17.4%)	(17.6%)	(14.7%)
2007	36,367	26,949	63,316	(28.7%)[5]	(31.9%)[5]	(27.7%)[5]
2008	30,887	30,596	61,483	(15.1%)	13.5%	(2.9%)
2009	27,856	32,220	60,076	(9.8%)	5.3%	(2.3%)
2010	25,543	26,231	51,744	(8.3%)	(18.6%)	(13.8%)
2011[1]	25,555	31,741	57,296	0.0%	21.0%	10.7%
2012	27,542	37,909	65,451	7.8%	19.4%	14.2%
2013	28,790	38,067	66,857	4.5%	0.4%	2.1%
2014	31,485	36,848	68,333	9.4%	(3.2%)	2.2%
2015	37,478	36,125	73,603	19.0%	(2.0%)	7.7%
2016	40,872	36,143	77,015	9.1%	0.0%	4.6%
2017	46,117	37,233	83,350	12.8%	3.0%	8.2%
2018	**50,821**	**37,953**	**88,774**	**10.2%**	**1.9%**	**6.5%**
2019	**53,635**	**40,928**	**94,563**	**5.5%**	**7.8%**	**6.5%**

Table G-1A Logan Express Bus Service Ridership (Continued)

	Ridership			Percent Change		
Service Year	Air Passengers	Employees	Total	Air Passengers	Employees	Total
Total System Ridership						
1992	397,116	17,358	414,474	8.0%	19.2%	8.5%
1993	493,908	39,832	533,740	24.4%	129.5%	28.8%
1994	617,545	63,923	681,468	25.0%	60.5%	27.7%
1995	689,480	105,228	794,708	11.6%	64.6%	16.6%
1996	851,463	143,773	995,236	23.4%	36.6%	25.2%
1997	816,015	185,229	1,001,254	(4.2%)	28.8%	0.6%
1998	845,598	212,952	1,058,550	3.6%	15.0%	5.7%
1999	868,987	180,727	1,049,714	2.7%	(15.2%)	(0.8%)
2000	923,236	211,717	1,134,953	6.2%	17.1%	8.1%
2001	885,296	236,395	1,121,691	(4.1%)	11.7%	(1.2%)
2002	855,632	326,707	1,182,339	(3.4%)	38.2%	5.4%
2003	808,335	400,132	1,208,467	(5.5%)	22.5%	2.2%
2004	857,530	408,297	1,265,827	6.1%	2.0%	2.2%
2005	837,034	397,660	1,234,694	(2.4%)	(2.6%)	(2.4%)
2006	891,918	418,051	1,309,969	6.6%	5.1%	6.1%
2007	797,530	404,222	1,201,752	(4.7%)[5]	1.7%[5]	(2.7%)[5]
2008	688,673	432,761	1,121,434	(13.6%)	7.1%	(6.7%)
2009	636,847	448,601	1,085,448	(7.5%)	3.7%	(3.2%)
2010	644,412	467,020	1,111,432	1.2%	4.1%	2.4%
2011[1]	649,609	536,513	1,186,122	0.8%	14.9%	6.7%
2012	681,040	624,149	1,305,189	4.8%	16.3%	10.0%
2013	733,005	634,693	1,367,698	8.0%	2.0%	5.0%
2014	788,151	632,011	1,420,162	7.5%	(0.4%)	3.8%
2015	860,203	622,005	1,482,208	9.1%	-1.6%	4.4%
2016	946,872	652,468	1,599,340	10.1%	4.9%	7.9%
2017	1,002,909	695,504	1,698,410	5.9%	6.6%	6.2%
2018	**1,063,250**	**750,615**	**1,813,865**	**6.0%**	**7.9%**	**6.8%**
2019	**1,131,263**	**824,084**	**1,955,347**	**6.4%**	**9.8%**	**7.8%**

Notes: January 23, 2008: I-90/Ted Williams Tunnel opens to all traffic.
NA Not applicable.
1 Changes to employee parking and bus fares were implemented in October 2011.
2 Woburn Express moved from Mishawum Station to the Anderson Regional Transportation Center (ARTC) in Woburn in May 2001.
3 Reflects a partial year of operation. Woburn Logan Express service was implemented in November 1992.
4 Reflects a partial year of operation. The Peabody Logan Express service commenced in September 2001.
5 Percent comparison between 2007 and 2005. The I-90 Ted Williams Tunnel closures in 2006 resulted in atypical ridership.

Table G-1B	Logan Express Back Bay Service Ridership[1]	
	Ridership	**Percent Change**
Service Year		
2014	152,892	NA
2015	290,796	NA
2016	216,329	(25.6%)
2017	137,326	(36.5%)
2018	**118,663**	**(13.6%)**
2019	**250,477**	**111.1%**

Source: Massport.

1 Back Bay Logan Express service commenced in April 2014. Only total ridership available.

Table G-2 Water Transportation Services Ridership to and from Logan Airport

	Rowes Wharf/Fan Pier Water Shuttle	Private Water Taxi (on-demand)	Harbor Express (Hingham-Hull-Boston Logan)[1]	Boston Logan Water Shuttle (Long Wharf)	Total
1990	181,530	NS	NS	NS	181,530
1991	142,500	NS	NS	NS	142,500
1992	133,297	NS	NS	NS	133,297
1993	159,525	NS	NS	NS	159,525
1994	209,057	NS	NS	NS	209,057
1995	203,829	NS	NS	NS	203,829
1996	159,992	3,364	11,781	NS	175,137
1997	132,542	6,299	71,309	NS	210,150
1998	124,836	9,243	101,174	NS	235,253
1999	122,211	17,252	98,539	NS	238,002
2000	128,097	26,335	83,243	NS	237,675
2001	107,400	29,642	82,704	NS	219,746
2002	75,304	36,736	66,471	NS	178,511
2003	26,480[2]	35,724[3]	61,849	5,722[4]	129,775
2004	NS	54,540	58,788	3,202[5]	116,530
2005	NS	44,975	51,960	NS	96,935
2006	NS	63,639	70,998	NS	134,637
2007	NS	50,737	59,460	NS	110,197
2008	NS	48,630	48,003	NS	96,633
2009	NS	50,734	37,861	NS	88,595
2010	NS	54,382	34,794	NS	89,176
2011	NS	58,879	33,403	NS	92,282
2012	NS	60,840	30,337	NS	91,177
2013	NS	70,378	21,952	NS	92,303
2014	NS	67,479	19,340	NS	86,819
2015	NS	70,798	7,748	NS	78,546
2016	NS	74,788	7,757	NS	82,545
2017	NS	83,689	7,424	NS	91,113
2018	**NS**	**77,813**	**6,609**	**NS**	**84,422**
2019	**NS**	**61,071**	**7,467**	**NS**	**68,538**

Source: Massport.
Notes: Figures from 2003 – 2007 have been revised from previous documents.
NS Operation not in service.
1 Service to Quincy was discontinued in 2013 and now operates between Hingham/Hull/Boston (Long Wharf)/Logan.
2 Rowes Wharf Water Shuttle operated from January to June only in 2003.
3 Operated from May to October only in 2003.
4 Long Wharf Boston Logan Water Shuttle operated from August to December in 2003.
5 Joint operation with City Water Taxi began on August 16, 2003.

Table G-3 Massachusetts Bay Transportation Authority (MBTA) Airport Station Passengers

Year	Entrances	Exits	Total Turnstile Count[1]	Percent Change
1990	NA	NA	2,854,317	-
1991	NA	NA	2,515,293	(11.9%)
1992	NA	NA	2,626,572	4.2%
1993	NA	NA	2,604,980	(0.8%)
1994	NA	NA	3,108,734	19.3%
1995	NA	NA	3,040,868	(2.2%)
1996	NA	NA	2,974,850	(2.2%)
1997[2]	NA	NA	2,774,268	(6.7%)
1998	NA	NA	2,850,367	2.7%
1999	NA	NA	2,974,045	4.3%
2000	NA	NA	3,019,086	1.5%
2001	NA	NA	2,896,638	(4.1%)
2002	NA	NA	2,670,594	(7.8%)
2003[3]	1,300,272	1,275,627	2,575,899	(3.6%)
2004	1,373,861	1,366,511	2,740,372	6.4%
2005	NA	NA	NA	NA
2006	NA	NA	NA	NA
2007[4]	1,412,055	--	2,524,079	--
2008[5]	2,212,111	--	3,647,394	56.7%
2009[5]	2,329,370	--	3,750,549	5.3%
2010[5]	2,270,241	--	3,629,193	(2.5%)
2011	2,277,311	NA	NA	0.3%
2012	2,442,085	NA	NA	7.2%
2013	2,597,306	NA	NA	6.3%
2014	2,378,965	NA	NA	(8.4%)[6]
2015	2,122,597	NA	NA	(10.8%)[6]
2016	2,240,744	NA	NA	5.6%
2017	2,197,783	NA	NA	(1.9%)
2018	**2,295,250**	**NA**	**NA**	**4.4%**
2019	**1,635,147**	**NA**	**NA**	**(28.8%)**

Source: MBTA.
Notes: Total Turnstile count figures include Logan Airport bound (turnstile exits) and non-Logan Airport bound (turnstile entrances) passengers.
NA Data not available
1 As stated in the *Logan Airport 1999 ESPR*, Massport believes that ridership estimates through 2005 from the old Airport Station were understated because many travelers that were destined for the Airport with baggage had been observed to avoid the turnstiles and exit the old Airport Station via the wide gate (designed for handicapped access) that did not have the capability to count passengers.
2 Airport Station was closed on six weekends during September and October 1997 due to construction.
3 Airport Station was closed on eight weekend days during 2003.
4 Automated fare collection and new fare gates implemented beginning January 2007. Station access to Bremen Street Park opened June 2007. Exits are undercounted.
5 Exits are undercounted, as some exits occur through exit doors rather than turnstiles.
6 Due to the closure of Government Center Station in 2014, it is possible that passengers who would normally take the Blue Line to the Green Line switched to alternate modes for their trips.

Table G-4 Annual Taxi Dispatches (Tickets Sold)

Year	Total (yearly tickets sold)	Percent Change
1990	1,330,418	-
1991	1,208,611	(9.2%)
1992	1,266,033	4.8%
1993	1,336,603	5.6%
1994	1,409,505	5.5%
1995	1,499,869	6.4%
1996	1,721,093	14.7%
1997	1,827,244	6.2%
1998	1,888,281	3.3%
1999	1,955,895	3.6%
2000	2,140,724	9.4%
2001	1,789,736	(16.4%)
2002	1,679,508	(6.2%)
2003	1,562,076	(7.0%)
2004	1,713,696	9.7%
2005	1,769,876	3.3%
2006	1,857,609	5.0%
2007	1,925,817	3.7%
2008	1,749,730	(9.1%)
2009	1,630,333	(6.8%)
2010	1,829,961	12.1%
2011	1,937,743	6.0%
2012	2,022,239	4.4%
2013	2,131,371	5.0%
2014	2,237,793	5.0%
2015	2,302,059	2.9%
2016	2,420,391	5.1%
2017	1,975,174	(18.4%)
2018	**1,697,831**	**(14.0%)**
2019	**1,573,627**	**(7.3%)**

Source: Massport.

Table G-5A On-Airport Commercial Parking Rates, 2010-2019 (Terminal Area Facilities[1])

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
0 to 30 minutes	$3	$3	$3	$3	$3	$3	$3	N/A	**N/A**	**N/A**
31 minutes to 1 hour	$6	$6	$6	$6	$6	$6	$6	N/A	**N/A**	**N/A**
0 minutes to 1 hour							N/A	$7	**$7**	**$8**
1 to 1.5 hours	$9	$9	$9	$9	$11	$10	$12	N/A	**N/A**	**N/A**
1.5 to 2 hours	$12	$12	$12	$12	$14	$14	$17	N/A	**N/A**	**N/A**
1 to 2 hours							N/A	$19	**$19**	**$21**
2 to 3 hours	$15	$15	$17	$17	$19	$19	$22	$24	**$24**	**$26**
3 to 4 hours	$18	$18	$21	$21	$23	$23	$26	$28	**$28**	**$30**
4 to 7 hours	$22	$22	$25	$25	$27	$27	$30	$32	**$32**	**$34**
7 to 24 hours (Daily)	$24	$24	$27	$27	$29	$29	$32	$35	**$35**	**$38**
Additional days 0 to 6 hours	$12	$12	$14	$14	$15	$15	$16	$18	**$18**	**$19**
Additional day(s) 6 to 24 hours	$24	$24	$27	$27	$29	$29	$32	$35	**$35**	**$38**

1 Central/West Parking Garage, Terminal B Garage, Terminal E Lots

Table G-5B On-Airport Commercial Parking Rates, 2010-2019 (Economy Parking)

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Daily Rate	$18	$18	$18	$18	$20	$20	$23	$26	**$26**	**$29**
Additional days 0 to 6 hours	$9	$9	$9	$9	$10	$10	$12	$13	**$13**	**$15**
Additional days 6 to 24 hours	$18	$18	$18	$18	$20	$20	$23	$26	**$26**	**$29**
Weekly Rate (6-7 days)	$108	$108	$108	$108	$120	$120	$138	N/A	**N/A**	**N/A**

Source: Massport.

Table G-6 Logan Airport Employee Parking Supply

	Number of Spaces											
Location	**March 2014**	**September 2014**	**March 2015**	**September 2015**	**March 2016**	**September 2016**	**March 2017**	**October 2017**	**March 2018**	**October 2018**	**March 2019**	**October 2019**
Terminal Area	857	868	868	865	865	865	865	865	**865**	**865**	**865**	**901**
North Service Area	883	883	881	876	876	876	876	876	**876**	**876**	**876**	**833**
Southwest Service Area	4	4	14	16	16	16	16	16	**16**	**16**	**16**	**16**
South Service Area	681	681	674	665	665	665	665	665	**665**	**665**	**665**	**695**
Airside (Fire/Rescue)	0	0	0	0	0	0	0	0	**0**	**0**	**0**	**0**
Total spaces in service	2,425	2,436	2,437	2,422	2,422	2,422	2,422	2,422	**2,422**	**2,422**	**2,422**	**2,445**
Total spaces out of service	248	237	236	251	26	26	26	26	**26**	**26**	**26**	**3**
Total employee spaces	2,673	2,673	2,673	2,673	2,448	2,448	2,448	2,448	**2,448**	**2,448**	**2,448**	**2,448**

Source: Logan Airport Parking Space Inventory submitted to Massachusetts Department of Environmental Protection (MassDEP), March and September 2014, 2015, 2016, 2017 (September 2017 was revised in October 2017). 2018 and, 2019.

Table G-7 Logan Airport Commercial Parking Supply

Location	Mar 2014	Sep 2014	Mar 2015	Sept 2015	Mar 2016	Sep 2016	Mar 2017	Oct 2017	Mar 2018	Sep 2018	Mar 2019	Sep 2019
	Number of Spaces											
Terminal Area												
Central Garage and West Garage	10,267	10,267	10,267	10,340	11,954	11,954	11,954	11,954	**11,954**	**11,954**	**11,954**	**10,964**
Terminal B Garage	2,254	2,254	2,254	2,201	2,212	2,212	2,212	2,212	**2,212**	**2,212**	**2,212**	**2,212**
Terminal E Lot 1	275	275	243	237	237	237	237	237	**237**	**237**	**237**	**237**
Terminal E Lot 2	248	248	248	249	249	249	249	249	**249**	**249**	**249**	**203**
Terminal E Lot 3 (Gulf Lot)	219	219	219	217	217	217	217	217	**217**	**217**	**217**	**93**
Signature (General Aviation)	35	35	35	35	35	35	35	35	**35**	**35**	**35**	**35**
Logan Airport Hilton	235	235	35	35	235	235	235	235	**235**	**235**	**235**	**63**
North Service Area												
Economy Garage	2,809	2,809	2,809	2,864	2,864	2,864	2,864	2,864	**2,864**	**2,864**	**2,864**	**2,864**
Overflow Green Lot (Wood Island)	0	0	235	242	0	0	0	0	**0**	**0**	**0**	**0**
South Service Area												
Harborside Hyatt Conference Center and Hotel	270	270	270	270	270	270	270	270	**270**	**270**	**270**	**270**
Overflow Blue Lot (Harborside Dr.)	0	0	315	339	367	367	367	367	**367**	**0**	**0**	**0**
Southwest Service Area												
Overflow Red Lot (Tomahawk Dr.)	0	0	282	282	0	0	0	0	**0**	**0**	**0**	**100**
Massport In-Service Parking Supply (lined spaces)	16,072	16,072	16,872	16,971	18,100	18,100	18,100	18,100	**18,100**	**18,100**	**18,100**	**18,100**
Total spaces in service[1]	16,612	16,612	17,212	17,311	18,640	18,640	18,640	18,640	**18,640**	**18,273**	**18,273**	**17,041**
Total spaces out of service	1,803	1,803	1,203	1,104	-	-	-	5,000	**5,000**	**5,367**	**5,367**	**6,599**
Total commercial spaces	18,415	18,415	18,415	18,415	18,640	18,640	18,640	23,640	**23,640**	**23,640**	**23,640**	**23,640**

Source: Logan Airport Parking Space Inventory submitted to MassDEP, March and September 2014, 2015, 2016, 2017 (September 2017 was revised in October 2017), 2018, and 2019.

1 Total spaces in service includes Signature (General Aviation), Logan Airport Hilton, Harborside Hyatt Conference Center and Hotel, and overflow lots (Overflow Green Lot, Overflow Red Lot, etc.) from previous years.

Table G-8 2018 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
1	344	27	1,103	1,365	9,396	21,118	72	89	612	1,376
2	496	29	752	718	5,279	13,988	71	67	496	1,314
3	1,347	20	483	785	5,302	12,034	123	200	1,353	3,070
4	1,166	27	1,017	1,468	10,238	22,849	225	324	2,261	5,046
5	378	24	1,500	2,253	15,540	34,884	107	161	1,113	2,497
6	441	31	713	700	4,388	11,820	60	58	366	987
7	896	23	787	1,553	11,152	23,064	133	263	1,892	3,914
8	644	27	1,778	1,845	12,887	30,195	217	225	1,572	3,683
9	1,214	26	631	569	4,280	9,552	145	131	984	2,196
10	1,303	25	1,159	1,314	8,906	21,250	286	324	2,198	5,244
11	421	24	76	237	1,788	4,910	6	19	143	391
12	236	31	104	249	1,752	3,121	5	11	78	140
13	1,311	31	154	438	3,114	5,614	38	109	773	1,394
14	750	26	1,854	2,083	14,675	35,105	263	296	2,084	4,987
15	441	23	1,580	2,529	19,037	41,610	132	211	1,590	3,475
16	1,724	23	22	56	423	880	7	18	138	287
17	644	19	205	612	4,442	9,576	25	75	542	1,168
18	354	26	1,147	1,277	8,607	20,643	77	86	577	1,384
19	687	15	12	37	299	607	2	5	39	79
20	94	15	86	250	1,627	3,235	2	4	29	58
27	187	5	22	56	423	880	1	2	15	31
28	124	6	22	56	423	880	1	1	10	21
29	226	31	154	486	3,816	8,517	7	21	163	365
30	1,070	5	154	486	3,816	8,447	31	98	773	1,712
31	385	32	154	486	3,816	8,517	11	35	278	621
34	181	23	154	486	3,816	8,447	5	17	131	290
35	248	26	154	486	3,816	8,447	7	23	179	397
36	89	21	154	486	3,816	8,447	3	8	64	142
50	353	33	98	283	1,735	3,228	7	19	116	216
51	717	26	98	283	1,735	3,228	13	38	236	438
52	403	33	73	252	1,968	4,107	6	19	150	313
54	612	32	73	252	1,968	4,107	8	29	228	476
55	194	26	124	373	2,420	4,644	5	14	89	171
60	331	26	124	373	2,420	4,644	8	23	152	291

Table G-8 2018 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
61	224	9	26	90	685	1,416	1	4	29	60
62	218	24	196	256	1,881	4,368	8	11	78	180
64	232	5	170	166	1,196	2,952	7	7	53	130
65	593	26	294	539	3,617	7,597	33	61	406	853
66	465	25	212	381	2,472	5,467	19	34	218	482
90	582	6	99	342	2,653	5,523	11	38	292	609
107	260	20	27	20	157	468	1	1	8	23
108	389	24	108	154	1,088	2,383	8	11	80	176
109	114	27	51	197	1,547	2,811	1	4	33	61
110	169	28	51	197	1,547	2,811	2	6	50	90
112	237	30	51	197	1,547	2,811	2	9	69	126
113	565	17	212	381	2,472	5,467	23	41	264	585
114	609	32	97	175	1,057	2,198	11	20	122	254
115	451	29	14	10	73	230	1	1	6	20
116	399	22	153	231	1,446	3,161	12	17	109	239
117	283	22	56	56	388	963	3	3	21	52
118	295	29	14	10	73	230	1	1	4	13
119	240	12	62	87	561	1,142	3	4	25	52
120	365	30	118	143	949	2,105	8	10	66	146
121	356	17	14	10	73	230	1	1	5	16
122	486	16	18	29	259	619	2	3	24	57
123	486	18	40	28	204	579	4	3	19	53
126	631	20	27	20	157	468	3	2	19	56
127	652	24	108	154	1,088	2,383	13	19	134	294
128	257	32	40	28	204	579	2	1	10	28
129	257	18	18	29	259	619	1	1	13	30
132	361	23	52	83	617	1,416	4	6	42	97
133	236	27	108	154	1,088	2,383	5	7	49	107
134	1,521	30	171	445	3,152	5,773	49	128	908	1,663
135	1,542	27	98	141	970	2,074	29	41	283	606
139	96	14	25	63	460	948	0	1	8	17
140	295	27	249	288	2,179	4,786	14	16	122	267
142	257	29	260	486	3,469	6,605	13	24	169	322
144	518	9	224	331	2,529	5,955	22	33	248	584

Table G-8 2018 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
145	195	22	47	69	686	1,261	2	3	25	47
146	463	22	43	48	436	927	4	4	38	81
147	230	22	226	261	2,194	5,511	10	11	96	240
148	794	22	62	106	893	1,918	9	16	134	288
149	661	21	100	324	2,409	4,406	13	41	302	552
150	281	21	28	142	1,084	1,875	2	8	58	100
151	360	21	28	138	1,032	1,804	2	9	70	123
153	66	31	1	3	52	71	0	0	1	1
154	173	33	4	25	303	406	0	1	10	13
155	258	30	182	212	1,818	5,370	9	10	89	262
156	645	26	182	205	1,703	4,500	22	25	208	550
157	218	22	0	7	115	870	0	0	5	36
158	185	24	209	498	4,554	7,434	7	17	160	260
159	354	17	209	505	4,668	8,304	14	34	313	557
160	470	28	3	45	295	449	0	4	26	40
161	94	15	185	250	1,998	4,949	3	4	36	88
162	50	15	3	40	266	404	0	0	3	4
163	66	15	182	209	1,732	4,545	2	3	22	57
164	367	33	7	42	502	672	1	3	35	47
168	380	15	3	43	281	428	0	3	20	31
169	293	12	3	43	281	428	0	2	16	24
174	502	10	97	276	3,221	4,347	9	26	306	413
175	640	9	238	276	2,491	7,949	29	33	302	964
176	319	22	970	1,466	11,896	25,072	59	89	719	1,515
177	286	22	1,437	1,587	10,753	25,448	78	86	582	1,378
178	353	18	873	1,190	8,674	20,725	58	80	580	1,386
179	348	32	1,199	1,311	8,262	17,499	79	86	545	1,153
180	366	18	913	1,422	10,163	21,713	63	99	704	1,505
181	453	8	190	188	1,368	3,388	16	16	117	291
182	119	8	190	188	1,368	3,388	4	4	31	76
183	50	8	190	188	1,368	3,388	2	2	13	32
184	54	8	190	188	1,368	3,388	2	2	14	35
185	62	8	277	404	3,883	6,791	3	5	46	80
186	39	8	87	215	2,514	3,403	1	2	19	25

Table G-8 2018 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
193	138	9	238	276	2,491	7,949	6	7	65	208
194	932	21	238	276	2,491	7,949	42	49	440	1,403
195	79	10	3	43	281	428	0	1	4	6
196	49	10	10	60	707	944	0	1	7	9
197	83	5	13	103	989	1,372	0	2	16	22
198	692	5	7	64	532	762	1	8	70	100
199	70	27	7	64	532	762	0	1	7	10
204	2,022	8	277	404	3,883	6,791	106	155	1,487	2,601
205	71	26	188	401	4,024	6,302	3	5	54	85
206	142	26	209	498	4,554	7,434	6	13	122	200
207	859	33	99	237	2,020	4,167	16	39	329	678
208	284	32	278	177	1,263	3,382	15	9	68	182
209	80	18	606	986	6,824	14,454	9	15	103	219
210	71	11	606	986	6,824	14,454	8	13	92	194
211	390	18	884	1,162	8,087	17,836	65	86	597	1,317
212	117	18	606	986	6,824	14,454	13	22	151	320
213	1,344	22	1,786	2,612	18,837	42,438	455	665	4,795	10,802
214	449	32	1,297	1,548	10,282	21,666	110	132	874	1,842
215	1,110	32	1	17	218	2,367	0	4	46	498
216	905	32	713	683	4,170	9,453	122	117	715	1,620
217	1,050	32	234	655	4,557	8,278	47	130	906	1,646
218	581	25	793	976	7,885	18,546	87	107	868	2,041
219	1,063	32	393	278	2,045	4,913	79	56	412	989
220	415	32	626	503	3,798	8,843	49	39	298	695
221	698	33	233	225	1,752	3,931	31	30	232	520
222	1,920	29	50	55	396	948	18	20	144	345
223	1,564	28	1,187	1,254	9,930	23,459	351	371	2,941	6,949
224	377	29	139	296	2,226	4,224	10	21	159	302
225	551	29	116	265	1,981	3,636	12	28	207	379
226	788	33	23	31	245	588	4	5	37	88
227	1,303	33	206	200	1,602	3,570	51	49	395	881
228	580	30	1,382	1,247	8,483	19,435	152	137	932	2,135
229	1,653	31	331	296	2,580	5,981	103	93	808	1,873
230	2,058	29	1,051	952	5,904	13,454	410	371	2,301	5,244

Table G-8 2018 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
231	1,300	20	240	798	6,230	13,331	59	196	1,534	3,282
232	736	26	537	496	4,182	9,551	75	69	583	1,331
233	488	28	1,101	1,007	6,299	14,402	102	93	582	1,331
234	449	28	434	592	4,973	11,752	37	50	423	999
235	310	14	348	499	4,174	10,030	20	29	245	589
236	310	11	86	93	800	1,722	5	5	47	101
237	105	5	116	265	1,981	3,636	2	5	39	72
239	186	22	60	201	1,514	3,098	2	7	53	109
240	145	10	247	235	1,825	4,161	7	6	50	114
241	578	10	307	436	3,340	7,259	34	48	366	795
246	175	5	256	256	1,998	4,518	8	8	66	150
248	39	5	86	226	1,665	3,458	1	2	12	26
249	128	5	307	436	3,340	7,259	7	11	81	176
250	484	5	307	436	3,340	7,259	28	40	306	665
265	2,458	28	319	264	2,469	6,443	148	123	1,150	3,000
266	752	28	410	568	4,793	11,249	58	81	683	1,602
267	1,323	28	410	572	4,810	11,275	103	143	1,205	2,825
268	1,252	31	423	624	5,341	12,379	100	148	1,266	2,935
270	1,005	17	133	473	3,715	7,666	25	90	707	1,459
271	954	15	89	257	1,664	3,303	16	46	301	597
272	656	23	156	464	3,213	6,473	19	58	399	804
273	485	7	325	631	4,409	9,426	30	58	405	866
274	1,244	27	420	748	5,987	13,303	99	176	1,411	3,134
276	649	27	417	741	5,950	13,235	51	91	731	1,627
277	2,473	25	325	437	3,626	8,430	152	205	1,698	3,948
278	573	32	345	342	3,153	7,945	37	37	342	862
279	458	21	269	464	3,374	7,582	23	40	293	658
280	295	25	60	205	1,531	3,124	3	11	86	175
281	440	21	60	205	1,531	3,124	5	17	128	260
282	76	21	-	4	17	26	-	0	0	0
283	697	21	123	148	1,207	2,671	16	19	159	353
284	690	20	487	690	5,141	11,537	64	90	672	1,508
285	91	20	266	480	3,466	7,737	5	8	60	133
286	464	20	667	1,169	9,080	20,119	59	103	798	1,768

Table G-8 2018 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
287	229	29	667	1,169	9,080	20,119	29	51	394	873
288	500	10	667	1,169	9,080	20,119	63	111	860	1,905
289	738	26	1,408	1,862	14,692	32,435	197	260	2,054	4,533
290	190	27	1,238	1,516	12,246	26,659	45	55	441	959
291	494	32	278	177	1,263	3,382	26	17	118	316
292	689	26	960	1,340	10,983	23,277	125	175	1,433	3,037
293	325	29	2,260	2,321	15,205	35,652	139	143	936	2,194
294	396	25	654	772	5,222	11,052	49	58	392	829
295	1,017	30	1,607	1,549	9,983	24,600	309	298	1,923	4,738
296	162	19	170	346	2,445	5,775	5	11	75	177
297	140	19	170	346	2,445	5,775	5	9	65	153
298	951	12	401	522	3,644	6,921	72	94	656	1,246
299	805	14	205	464	3,179	7,534	31	71	485	1,149
300	518	16	209	258	1,843	4,458	21	25	181	437
301	749	7	206	255	1,823	4,416	29	36	259	626
302	652	15	654	772	5,222	11,052	81	95	645	1,365
308	319	13	182	188	1,375	3,376	11	11	83	204
309	281	7	190	188	1,368	3,376	10	10	73	180
310	555	27	519	731	6,628	12,608	55	77	697	1,325
311	208	17	932	1,422	11,648	24,577	37	56	459	968
312	125	17	510	967	8,241	16,317	12	23	195	386
313	332	27	592	732	5,278	14,218	37	46	332	894
314	440	27	1,669	1,667	11,070	26,998	139	139	923	2,250
315	215	16	603	867	6,316	15,214	25	35	257	620
316	543	17	190	176	1,296	3,244	20	18	133	334
317	180	14	441	608	4,355	10,669	15	21	148	364
318	221	11	352	548	4,006	9,577	15	23	168	401
319	2,544	9	542	737	5,374	12,954	261	355	2,589	6,241
321	628	14	182	188	1,375	3,376	22	22	164	402
322	181	12	88	60	350	1,092	3	2	12	37
323	58	12	88	60	350	1,092	1	1	4	12
325	406	12	88	60	350	1,092	7	5	27	84
327	463	13	30	70	618	1,319	3	6	54	116
328	79	16	30	70	618	1,319	0	1	9	20

Table G-8 2018 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
329	103	16	30	70	618	1,319	1	1	12	26
331	179	11	542	737	5,374	12,954	18	25	182	439
332	993	5	1,197	1,005	6,080	13,758	225	189	1,144	2,587
334	366	24	1,015	817	4,705	10,382	70	57	326	720
335	583	29	952	854	5,691	14,259	105	94	628	1,574
336	428	27	510	967	8,241	16,317	41	78	668	1,323
340	273	20	-	12	72	144	-	1	4	7
341	66	16	-	12	72	144	-	0	1	2
342	48	29	-	12	72	144	-	0	1	1
344	82	12	-	12	72	144	-	0	1	2
345	25	5	190	176	1,296	3,244	1	1	6	15
347	303	7	190	188	1,368	3,388	11	11	79	194
348	146	22	717	813	5,380	12,739	20	22	149	352
349	67	22	182	186	1,356	3,326	2	2	17	42
350	446	5	182	186	1,356	3,326	15	16	115	281
354	50	8	190	188	1,368	3,388	2	2	13	32
355	88	13	182	171	1,236	3,143	3	3	21	52
356	113	13	485	719	4,942	11,006	10	15	106	236
361	248	17	3	3	20	42	0	0	1	2
363	230	22	91	304	2,324	4,805	4	13	101	209
364	256	19	91	304	2,324	4,805	4	15	113	233
367	337	32	934	1,270	8,206	16,644	60	81	524	1,062
368	868	11	1,197	1,005	6,080	13,758	197	165	1,000	2,262
369	167	15	1,077	935	5,792	12,780	34	30	183	404
370	96	15	460	499	3,654	8,756	8	9	66	159
371	141	20	413	691	5,020	11,970	11	18	134	320
						Logan Airport VMT	**9,452**	**12,447**	**91,450**	**205,344**

Source: VHB.
Notes: AWDT = Average annual weekday daily traffic.

Table G-9 2019 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
1	344	27	1,146	1,361	9,810	21,423	75	89	639	1,396
2	496	29	760	772	5,594	14,456	71	72	525	1,358
3	1,347	20	503	705	5,102	12,196	128	180	1,302	3,111
4	1,166	27	1,068	1,478	10,535	23,994	236	326	2,326	5,299
5	378	24	1,571	2,184	15,637	36,190	112	156	1,119	2,591
6	441	31	780	636	4,683	12,385	65	53	391	1,034
7	896	23	791	1,548	10,954	23,805	134	263	1,859	4,040
8	644	27	1,821	1,876	13,670	31,162	222	229	1,667	3,801
9	1,214	26	602	565	4,303	9,908	138	130	989	2,278
10	1,303	25	1,231	1,348	9,663	21,861	304	333	2,385	5,395
11	421	24	85	256	1,733	4,717	7	20	138	376
12	236	31	68	239	1,460	2,705	3	11	65	121
13	1,311	31	122	450	2,898	5,347	30	112	720	1,328
14	750	26	1,906	2,133	15,403	35,879	271	303	2,188	5,096
15	441	23	1,541	2,459	18,334	42,769	129	205	1,531	3,572
16	1,724	23	22	56	434	880	7	18	142	287
17	644	19	183	644	4,160	9,116	22	79	507	1,112
18	354	26	1,219	1,311	9,367	21,254	82	88	628	1,425
19	687	15	12	37	296	607	2	5	39	79
20	94	15	94	270	1,841	3,685	2	5	33	66
27	187	5	22	56	434	880	1	2	15	31
28	124	6	22	56	434	880	1	1	10	21
29	226	31	134	591	3,715	8,323	6	25	159	356
30	1,070	5	134	591	3,715	8,314	27	120	753	1,685
31	385	32	134	591	3,715	8,323	10	43	271	607
34	181	23	134	591	3,715	8,314	5	20	127	285
35	248	26	134	591	3,715	8,314	6	28	174	391
36	89	21	134	591	3,715	8,314	2	10	63	140
50	353	33	91	237	1,629	3,052	6	16	109	204
51	717	26	91	237	1,629	3,052	12	32	221	415
52	403	33	77	242	1,943	3,834	6	19	148	293
54	612	32	77	242	1,943	3,834	9	28	225	444
55	194	26	135	425	2,907	5,711	5	16	107	210
60	331	26	149	489	3,356	6,717	9	31	210	421

Table G-9 2019 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
61	224	9	18	84	583	1,305	1	4	25	55
62	218	24	194	238	1,745	4,149	8	10	72	171
64	232	5	178	163	1,224	2,982	8	7	54	131
65	593	26	325	643	4,519	9,561	37	72	507	1,074
66	465	25	225	394	3,000	6,015	20	35	264	530
90	582	6	121	430	3,221	6,492	13	47	355	716
107	260	20	26	20	153	461	1	1	8	23
108	389	24	88	99	749	1,835	7	7	55	135
109	114	27	38	184	1,280	2,491	1	4	28	54
110	169	28	38	184	1,280	2,491	1	6	41	80
112	237	30	38	184	1,280	2,491	2	8	57	112
113	565	17	225	394	3,000	6,015	24	42	321	644
114	609	32	257	251	1,881	4,484	30	29	217	517
115	451	29	14	10	73	230	1	1	6	20
116	399	22	305	287	2,154	5,238	23	22	163	396
117	283	22	49	36	273	754	3	2	15	40
118	295	29	14	10	73	230	1	1	4	13
119	240	12	53	46	351	789	2	2	16	36
120	365	30	102	82	624	1,543	7	6	43	107
121	356	17	14	10	73	230	1	1	5	16
122	486	16	14	32	233	595	1	3	21	55
123	486	18	40	25	188	534	4	2	17	49
126	631	20	26	20	153	461	3	2	18	55
127	652	24	88	99	749	1,835	11	12	92	227
128	257	32	40	25	188	534	2	1	9	26
129	257	18	14	32	233	595	1	2	11	29
132	361	23	51	82	624	1,409	4	6	43	96
133	236	27	88	99	749	1,835	4	4	33	82
134	1,521	30	140	456	2,943	5,508	40	131	848	1,587
135	1,542	27	80	85	641	1,535	23	25	187	448
139	96	14	25	62	471	948	0	1	9	17
140	295	27	243	236	1,863	4,483	14	13	104	250
142	257	29	257	539	3,593	7,010	13	26	175	341
144	518	9	206	217	1,647	4,249	20	21	162	417

Table G-9 2019 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
145	195	22	67	90	635	1,342	2	3	23	50
146	463	22	60	60	430	988	5	5	38	87
147	230	22	252	285	2,220	5,706	11	12	97	249
148	794	22	46	68	573	1,457	7	10	86	219
149	661	21	20	90	614	1,270	3	11	77	159
150	281	21	25	122	799	1,638	1	7	43	87
151	360	21	23	118	761	1,565	2	8	52	107
153	66	31	1	5	39	73	0	0	0	1
154	173	33	8	34	243	426	0	1	8	14
155	258	30	191	227	1,863	5,575	9	11	91	272
156	645	26	190	217	1,744	4,627	23	27	213	565
157	218	22	0	10	120	948	0	0	5	39
158	185	24	332	644	4,029	7,687	12	23	141	269
159	354	17	332	655	4,148	8,635	22	44	278	579
160	470	28	6	41	246	486	1	4	22	43
161	94	15	197	258	1,990	5,113	3	5	35	91
162	50	15	6	37	222	438	0	0	2	4
163	66	15	191	221	1,768	4,675	2	3	22	58
164	367	33	13	57	407	708	1	4	28	49
168	380	15	6	39	235	463	0	3	17	33
169	293	12	6	39	235	463	0	2	13	26
174	502	10	251	486	2,884	4,814	24	46	274	458
175	640	9	353	342	2,683	8,063	43	41	325	977
176	319	22	935	1,595	11,130	25,576	56	96	672	1,545
177	286	22	1,575	1,568	10,906	25,539	85	85	591	1,383
178	353	18	684	1,109	8,246	20,761	46	74	551	1,388
179	348	32	1,222	1,226	8,223	17,475	81	81	542	1,152
180	366	18	938	1,315	10,527	23,192	65	91	730	1,608
181	453	8	198	185	1,398	3,418	17	16	120	293
182	119	8	198	185	1,398	3,418	4	4	32	77
183	50	8	198	185	1,398	3,418	2	2	13	32
184	54	8	198	185	1,398	3,418	2	2	14	35
185	62	8	432	589	3,703	7,235	5	7	43	85
186	39	8	233	404	2,306	3,817	2	3	17	28

Table G-9 2019 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
193	138	9	353	342	2,683	8,063	9	9	70	211
194	932	21	353	342	2,683	8,063	62	60	474	1,423
195	79	10	6	39	235	463	0	1	4	7
196	49	10	18	82	578	998	0	1	5	9
197	83	5	24	121	813	1,460	0	2	13	23
198	692	5	12	68	439	816	2	9	58	107
199	70	27	12	68	439	816	0	1	6	11
204	2,022	8	432	589	3,703	7,235	165	225	1,418	2,771
205	71	26	321	584	3,675	6,829	4	8	49	92
206	142	26	324	615	3,825	7,257	9	17	103	195
207	859	33	87	246	1,865	4,248	14	40	303	691
208	284	32	236	153	1,174	3,006	13	8	63	162
209	80	18	609	878	7,127	15,708	9	13	108	238
210	71	11	609	878	7,127	15,708	8	12	96	211
211	390	18	845	1,030	8,301	18,714	62	76	613	1,382
212	117	18	609	878	7,127	15,708	14	19	158	348
213	1,344	22	1,622	2,424	18,773	43,953	413	617	4,778	11,188
214	449	32	1,309	1,472	10,087	21,723	111	125	858	1,847
215	1,110	32	1	26	303	2,391	0	5	64	503
216	905	32	779	610	4,380	9,994	134	105	751	1,713
217	1,050	32	168	650	4,147	7,792	33	129	825	1,549
218	581	25	750	911	7,380	18,964	83	100	812	2,087
219	1,063	32	379	241	1,799	4,546	76	49	362	915
220	415	32	632	472	3,623	8,878	50	37	285	698
221	698	33	253	231	1,824	4,332	33	30	241	573
222	1,920	29	50	54	382	924	18	20	139	336
223	1,564	28	1,129	1,152	9,179	23,511	334	341	2,719	6,964
224	377	29	143	360	2,523	4,879	10	26	180	348
225	551	29	123	328	2,302	4,328	13	34	240	452
226	788	33	20	32	222	551	3	5	33	82
227	1,303	33	223	208	1,664	3,959	55	51	411	977
228	580	30	1,537	1,169	8,739	20,807	169	128	960	2,286
229	1,653	31	340	293	2,431	6,115	106	92	761	1,914
230	2,058	29	1,196	876	6,308	14,693	466	341	2,459	5,727

Table G-9 2019 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
231	1,300	20	189	903	5,778	12,593	47	222	1,423	3,100
232	736	26	563	501	4,095	10,073	79	70	571	1,404
233	488	28	1,247	930	6,690	15,616	115	86	618	1,443
234	449	28	446	587	5,101	12,352	38	50	434	1,050
235	310	14	355	502	4,422	10,737	21	29	260	630
236	310	11	91	85	679	1,616	5	5	40	95
237	105	5	121	322	2,252	4,217	2	6	45	84
239	186	22	61	197	1,503	2,922	2	7	53	103
240	145	10	331	409	2,898	6,880	9	11	80	189
241	578	10	328	437	3,400	7,483	36	48	372	819
246	175	5	274	262	2,046	4,883	9	9	68	162
248	39	5	91	219	1,663	3,295	1	2	12	24
249	128	5	328	437	3,400	7,483	8	11	82	181
250	484	5	328	437	3,400	7,483	30	40	312	686
265	2,458	28	246	342	2,368	6,121	115	159	1,102	2,849
266	752	28	309	623	4,330	10,507	44	89	617	1,497
267	1,323	28	309	627	4,347	10,533	77	157	1,089	2,639
268	1,252	31	321	743	4,976	11,603	76	176	1,180	2,751
270	1,005	17	113	566	3,754	7,777	21	108	715	1,480
271	954	15	97	276	1,878	3,753	18	50	339	678
272	656	23	187	573	4,080	8,192	23	71	507	1,018
273	485	7	364	727	5,242	11,037	33	67	482	1,014
274	1,244	27	398	727	5,966	13,670	94	171	1,406	3,221
276	649	27	395	721	5,929	13,602	49	89	729	1,672
277	2,473	25	332	440	3,967	9,216	156	206	1,858	4,316
278	573	32	275	430	3,124	7,765	30	47	339	843
279	458	21	283	456	3,518	7,977	25	40	305	692
280	295	25	68	230	1,723	3,378	4	13	96	189
281	440	21	68	230	1,723	3,378	6	19	144	281
282	76	21	-	4	17	26	-	0	0	0
283	697	21	138	158	1,256	2,926	18	21	166	386
284	690	20	481	664	4,900	11,551	63	87	640	1,510
285	91	20	244	446	3,163	7,362	4	8	55	127
286	464	20	652	1,213	9,370	21,200	57	107	823	1,863

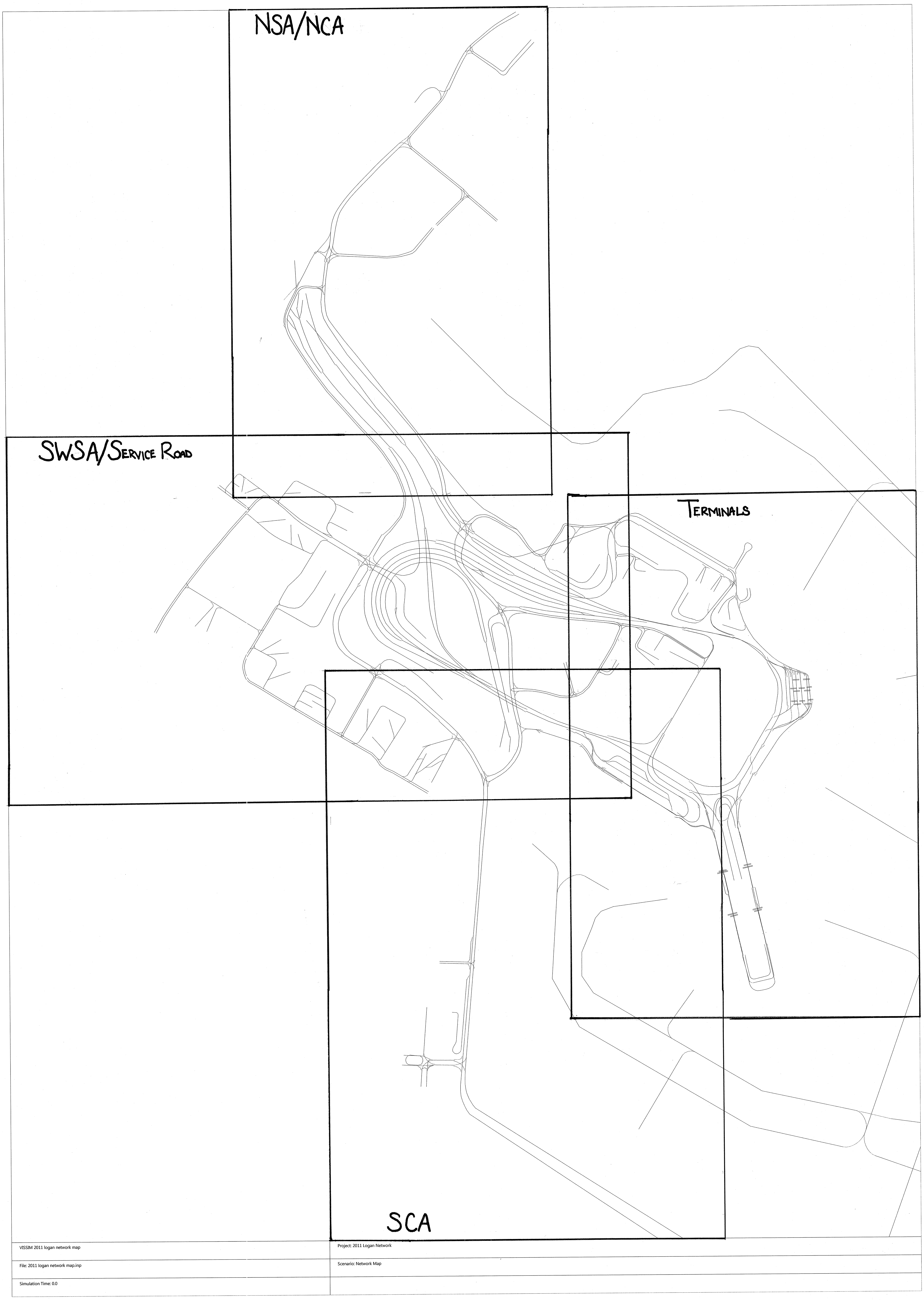
Table G-9 2019 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
287	229	29	652	1,213	9,370	21,200	28	53	406	919
288	500	10	652	1,213	9,370	21,200	62	115	887	2,008
289	738	26	1,354	1,969	14,176	32,575	189	275	1,981	4,553
290	190	27	1,205	1,680	11,545	26,571	43	60	415	956
291	494	32	236	153	1,174	3,006	22	14	110	281
292	689	26	969	1,527	10,371	23,565	126	199	1,353	3,075
293	325	29	2,478	2,278	16,353	37,477	153	140	1,007	2,307
294	396	25	714	757	5,734	11,857	54	57	430	889
295	1,017	30	1,764	1,520	10,619	25,620	340	293	2,045	4,935
296	162	19	150	289	2,631	6,004	5	9	81	184
297	140	19	150	289	2,631	6,004	4	8	70	159
298	951	12	441	532	3,860	7,539	80	96	695	1,358
299	805	14	168	345	3,267	8,170	26	53	498	1,246
300	518	16	215	226	1,795	4,599	21	22	176	451
301	749	7	212	224	1,775	4,557	30	32	252	647
302	652	15	714	757	5,734	11,857	88	94	708	1,464
308	319	13	190	185	1,400	3,406	11	11	85	206
309	281	7	198	185	1,398	3,406	11	10	74	181
310	555	27	745	966	6,202	13,328	78	101	652	1,401
311	208	17	930	1,586	10,965	25,036	37	62	432	986
312	125	17	436	1,106	7,648	16,522	10	26	181	391
313	332	27	883	773	5,762	15,099	56	49	362	949
314	440	27	1,891	1,644	11,464	27,513	158	137	955	2,293
315	215	16	383	793	6,077	14,982	16	32	247	610
316	543	17	198	173	1,314	3,274	20	18	135	337
317	180	14	224	561	4,169	10,237	8	19	142	349
318	221	11	168	528	3,902	9,433	7	22	163	395
319	2,544	9	366	713	5,299	12,839	176	344	2,553	6,186
321	628	14	190	185	1,400	3,406	23	22	166	405
322	181	12	56	33	267	803	2	1	9	28
323	58	12	56	33	267	803	1	0	3	9
325	406	12	56	33	267	803	4	3	21	62
327	463	13	16	60	499	1,102	1	5	44	97
328	79	16	16	60	499	1,102	0	1	7	16

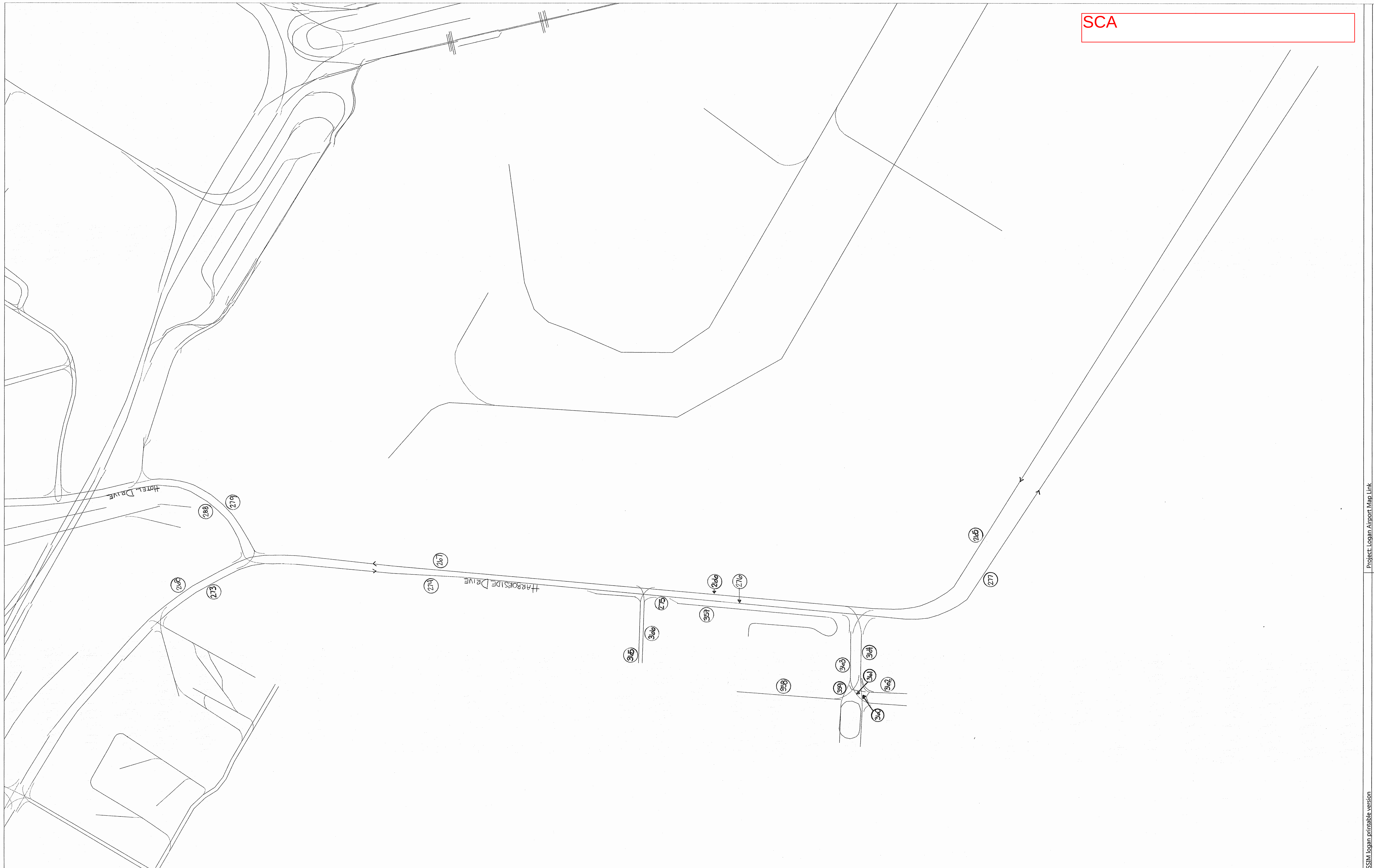
Table G-9 2019 Existing Conditions – Airport-Related Traffic, On-Airport Link Attributes, Traffic Assignment and Vehicle Miles Traveled (VMT) Summary (Continued)

Link Name	Link Distance (ft)	Link Speed (mph)	VOLUME				VMT			
			AM Peak	PM Peak	High 8-Hour	AWDT	AM Peak	PM Peak	High 8-Hour	AWDT
329	103	16	16	60	499	1,102	0	1	10	21
331	179	11	366	713	5,299	12,839	12	24	180	435
332	993	5	1,072	932	6,257	13,926	202	175	1,177	2,619
334	366	24	881	748	4,857	10,520	61	52	337	729
335	583	29	980	862	5,738	13,948	108	95	634	1,540
336	428	27	436	1,106	7,648	16,522	35	90	620	1,339
340	273	20	-	12	84	144	-	1	4	7
341	66	16	-	12	84	144	-	0	1	2
342	48	29	-	12	84	144	-	0	1	1
344	82	12	-	12	84	144	-	0	1	2
345	25	5	198	173	1,314	3,274	1	1	6	16
347	303	7	198	185	1,398	3,418	11	11	80	196
348	146	22	911	782	5,726	13,565	25	22	158	375
349	67	22	190	183	1,384	3,356	2	2	18	43
350	446	5	190	183	1,384	3,356	16	15	117	283
354	50	8	198	185	1,398	3,418	2	2	13	32
355	88	13	190	168	1,264	3,173	3	3	21	53
356	113	13	595	690	5,048	11,407	13	15	108	244
361	248	17	3	2	20	42	0	0	1	2
363	230	22	63	281	1,962	4,387	3	12	85	191
364	256	19	63	281	1,962	4,387	3	14	95	213
367	337	32	929	1,165	7,849	16,323	59	74	501	1,042
368	868	11	1,072	932	6,257	13,926	176	153	1,029	2,289
369	167	15	1,008	872	5,702	12,413	32	28	180	393
370	96	15	499	489	3,482	9,054	9	9	63	165
371	141	20	185	621	4,764	11,708	5	17	127	313
						Logan Airport VMT	**9,477**	**12,577**	**91,336**	**209,900**

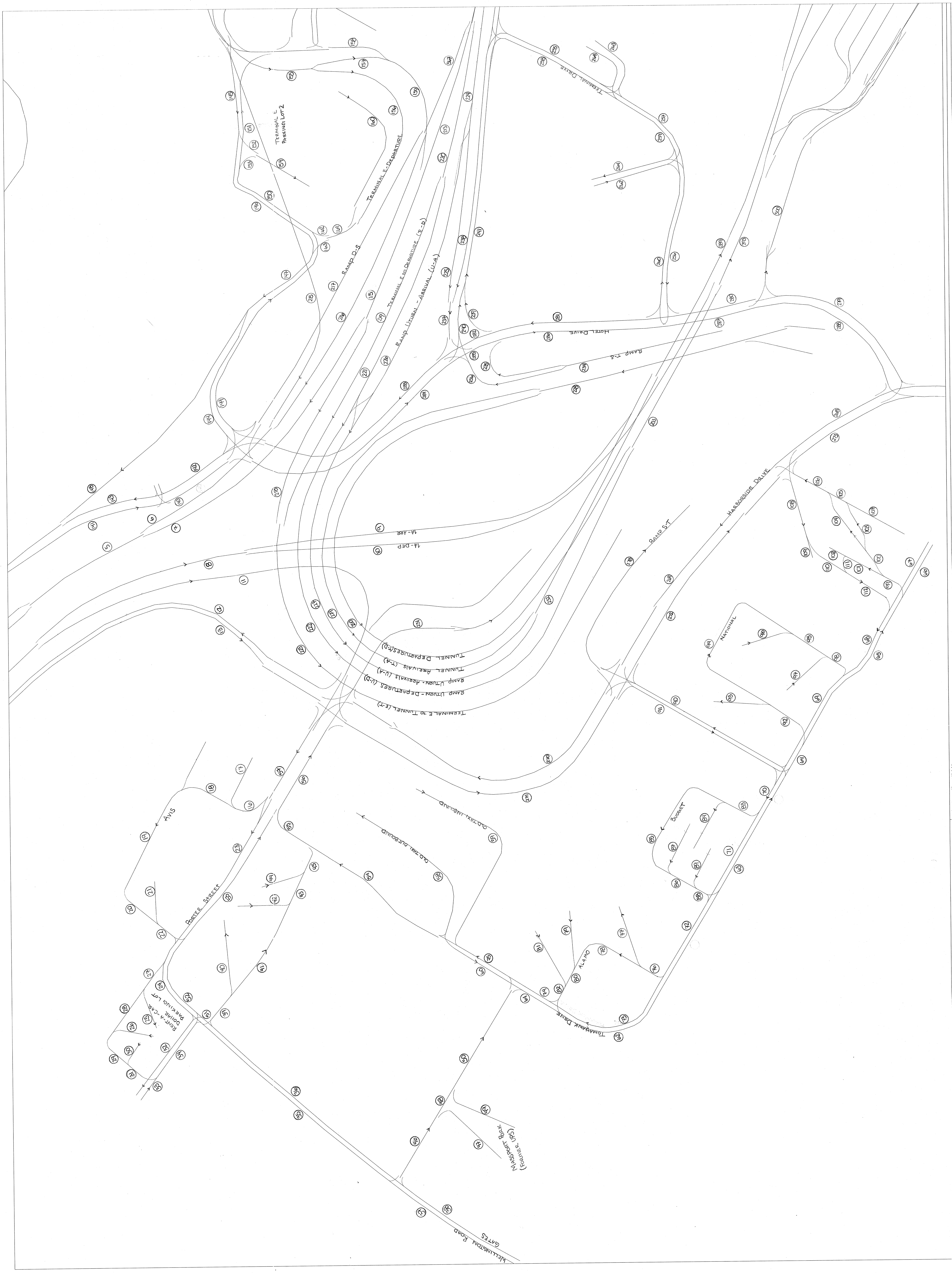
Source: VHB.
Notes: AWDT = Average annual weekday daily traffic.


NSA/NCA
SWSA/Service Road
Terminals
SCA
VISSIM 2011 logan network map
Project: 2011 Logan Network
File: 2011 logan network map.inp
Scenario: Network Map
Simulation Time: 0.0

VISSIM logan printable version
File: logan printable version.inp
Simulation Time: 0.0
Project: Logan Airport Link Map
Scenario: Logan North, Noth Cargo Area
NSA/NCA
SCT 1B
RT 1A-1B
RT 1A-0B
SCT 0B
Cottage Street
Economy Bus Driveway
Service Road
Economy Parking Drive
Prescott Street
Ramp 1A-SB
Frankfort Street
Lovell


SCA
Hotel Drive
Harborside Drive
Project: Logan Airport Map Link
Scenario: Harborside Drive
VISSIM logan printable version
File: logan printable version.inp
Simulation Time: 0.0

SWSA/Service Roadways




Terminals
Terminal Drive
Project: Logan Airport Link Map
Scenario: Logan Tunnel Ramps, Rental Car Lots
VISSIM logan printable version
File: logan printable version.inp
Simulation Time: 0.0

Massachusetts Port Authority
One Harborside Drive, Suite 200-S
East Boston, MA 02128-2909
Telephone: 617-568-5000
www.massport.com

March 15, 2018

Christine Kirby, Director, Air & Climate Division
Massachusetts Department of Environmental Protection
Bureau of Air & Waste
One Winter Street
Boston, MA 02108

Re: Logan Airport Parking Space Inventory

Dear Ms. Kirby:

In compliance with the reporting requirements of 310 CMR 7.30(3)(a), enclosed please find the following Massachusetts Port Authority (Massport) submissions for Logan Airport (the Airport):

- Commercial Parking Space Inventory;
- Employee Parking Space Inventory; and
- Location Map.

The attachments provide the quantity, physical distribution, and allocation of commercial and employee parking spaces on the Airport, as defined by 310 CMR 7.30, as amended, effective as of June 30, 2017. These inventory tables represent information provided by the Aviation Department and are supported by comprehensive field checks and counts conducted in March, 2018.

The Revised Logan Airport Parking Space Inventory reflects the 310 CMR 7.30, as amended, and effective on June 30, 2017. Accordingly, the Commercial Parking Space Inventory totals 23,640 parking spaces; the Employee Parking Space Inventory totals 2,448 parking spaces; and the total inventory of parking spaces at the Airport is 26,088. Additionally, for your information, we continue to provide information on rental car parking spaces, also attached.

The attached Logan Airport Parking Space Inventory reflects Massport's successful management of its parking program, within the requirements of 310 CMR 7.30, as amended.

If you have any questions, please call me at 617-568-3689.

Sincerely,

Hayes Morrison
Deputy Director - Maritime, Land Use, and
Transportation Planning
Strategic & Business Planning Department

cc: D. Conroy, EPA
L. Gilmore, MPA
S. Dalzell, MPA
M. Kalowski, MPA

Commercial Parking Space Inventory
Logan International Airport
March 2018 Submission

Commercial Parking Spaces

Old Map ID#	Map ID#	Location of Commercial Parking Areas	Mar-18 Number of Spaces
	Terminal Area and Economy Spaces		
C1a	C1	Central Garage	7179
C1b	C2	West Garage	3076
		West Garage Expansion	1699
C2	C3	Terminal B Garage	2212
C8a	C5	Terminal E Lot 1	237
C8b	C6	Terminal E Lot 2	249
C9	C7	Terminal E Lot 3 (fka "Gulf Station" Lot)	217
	C12	Blue Lot	367
C6	C8	Economy Garage	2864
		subtotal	18100
	Overflow Commercial Spaces		
	C11	Red Lot (Tomahawk Dr.)	
	C13	Green Lot (Wood Island)	
		subtotal	0
	Hotel Spaces		
C4	C4a ~~& C4b~~	Logan Airport Hilton Hotel (one lot)	235
C7a	C10	Harborside Hyatt Conference Center	270
		subtotal	505
	General Aviation Spaces		
C5	C9	Signature (General Aviation Terminal)	35
		subtotal	35

Total In-Service Commercial Parking Spaces	**18,640**
Total Designated Commercial Parking Spaces	**23,640**
Total Commercial Parking Spaces	**23,640**
Total Employee Parking Spaces *(see table on next page)*	**2,448**
TOTAL PARKING FREEZE SPACES	**26,088**

Employee Parking Space Inventory
Logan International Airport
March 2018 Submission

Employee Parking Spaces

Area		Map ID#	Location of Employee Parking Areas	Mar-18 Number of Spaces
Terminal	Terminal Area	E81	West Garage	98
Terminal	Terminal Area	E26	Airport Tower/Administration (parking in Central Garage)	521
Terminal	Terminal Area	E20	Terminal C Pier A (Old Terminal D) (two lots)	122
Terminal	Terminal Area	E18	Massport Facilities 1 (Heating Plant)	92
Terminal	Terminal Area	E34	Hilton Hotel employee lot	28
Terminal	Terminal Area	E86	Gulf Gas Station	4
North	North Service Area	E68a	LSG Sky Chefs (Bldg. 68), main lot	25
North	North Service Area	E68b	LSG Sky Chefs (Bldg. 68), overflow lot	126
North	North Service Area	E1	Flight Kitchen Building 1 (and nearby lot)	80
North	North Service Area	E40	Lovell Street Lot (contractor trailer)	25
North	North Service Area	E53	Green Bus Depot (Bus Maintenance Facility)	12
North	North Service Area	E11a	North Cargo Building 11, TSA lot	93
North	North Service Area	E11b	North Cargo Building 11, State Police lot	136
North	North Service Area	E43	North Gate & EMS Trailer (EMS Station A7)	21
North	North Service Area	E8	North Cargo Building 8	114
North	North Service Area	E5	US Airways Administration/Hangar (Bldg. 5)	75
airside	North Service Area	*N/A*	Massport Facilities 2 (airside, Bldg. 3)	0
North	North Service Area	E4	Massport Facilities 3 (landside, Bldg. 4)	69
North	North Service Area	E13	UPS (Cargo Building 13)	44
North	North Service Area	E94	United Aircraft Maintenance (Buildings 93 & 94)	56
SW	SWSA	E59	Bus/Limo Pool Lot	4
SW	SWSA	E60	Rental Car Center (Customer Service Center)	4
SW	SWSA	E72	Taxi Pool Lot	8
South	South Service Area	E84	Bird Island Flats / Logan Office Center (LOC) Garage	416
South	South Service Area	E63	South Cargo Building 63	16
South	South Service Area	E62	South Cargo Building 62	43
South	South Service Area	E58	South Cargo Building 58	23
South	South Service Area	E57	South Cargo Building 57	44
South	South Service Area	E56	South Cargo Building 56	39
South	South Service Area	E78	Fire-Rescue HQ & Amelia Earhart Terminal/Hangar	84
airside		*N/A*	*ARFF Satellite Station* [1]	0

[1] This facility is located on the airfield and is not shown in the map. No employee parking spaces are provided.

Total In-Service Employee Parking Spaces	**2,422**
Total Designated Employee Parking Spaces	**26**
Total Employee Parking Spaces	**2,448**
Total Commercial Parking Spaces *(see table on previous page)*	**23,640**
TOTAL PARKING SPACES	**26,088**
TOTAL PARKING FREEZE SPACES	26,088

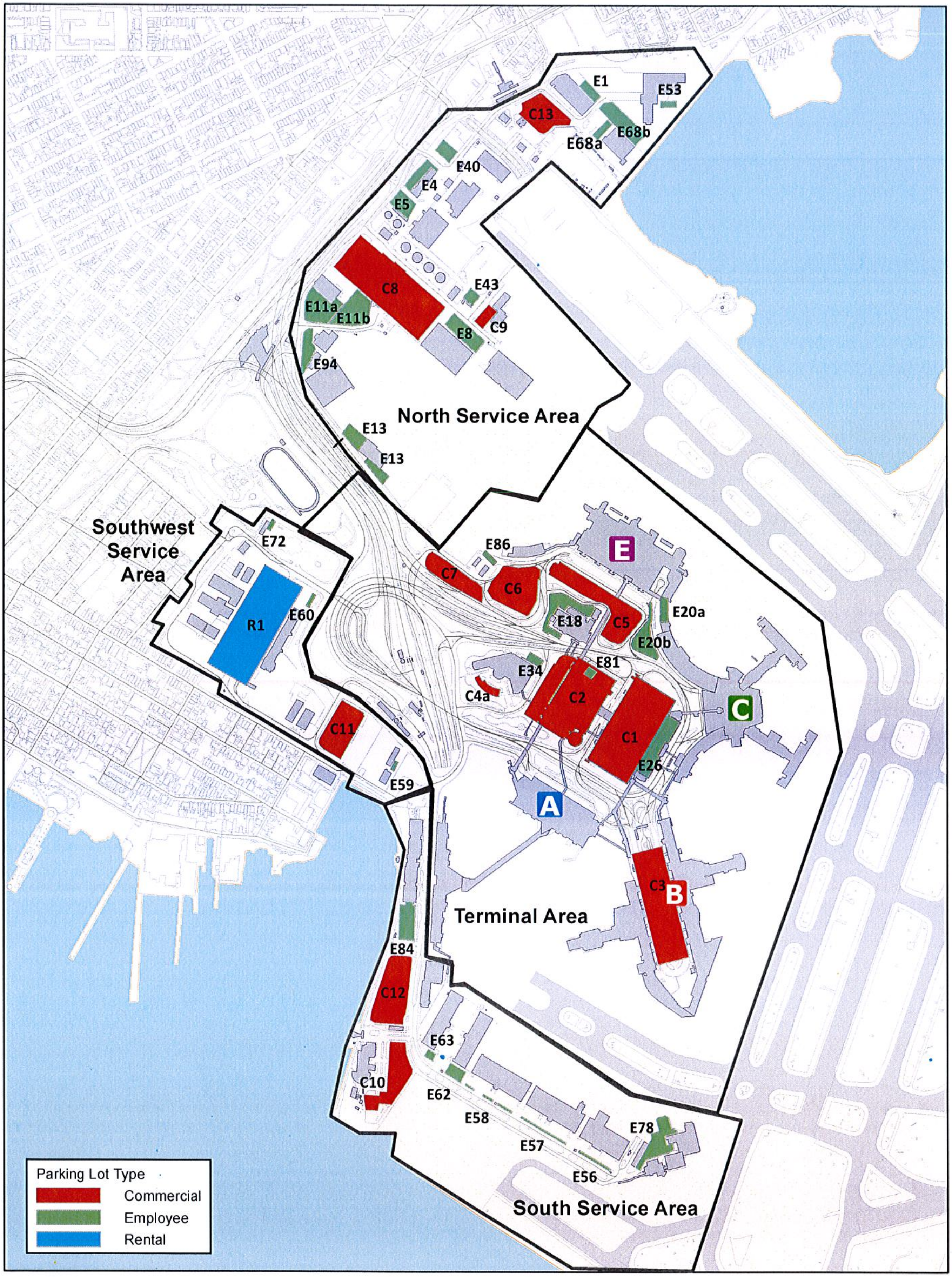
SUMMARY

TOTAL COMMERCIAL PARKING SPACES	***23,640***
TOTAL EMPLOYEE PARKING SPACES	***2,448***
TOTAL PARKING FREEZE SPACES	***26,088***

For Information Only:
Rental Car Spaces Inventory
Logan International Airport
March 2018 Submission

Rental Car Company Parking Spaces

Map ID#		Number of Spaces
R1	Rental Car Center (RCC)	5,020
Total Rental Car Spaces		**5,020**



Massachusetts Port Authority
Strategic and Business Planning
September 2016

N

0 0.075 0.15 0.3 Miles

Logan Airport Parking Space Inventory

Projection: Lambert Conformal Conic **Coordinate System:** NAD 1983 State Plane Massachusetts Mainland FIPS 2001 (Meter)

Massachusetts Port Authority
One Harborside Drive, Suite 200-S
East Boston, MA 02128-2909
Telephone: 617-568-5000
www.massport.com

September 18, 2018

Christine Kirby, Director, Air & Climate Division
Massachusetts Department of Environmental Protection
Bureau of Air & Waste
One Winter Street
Boston, MA 02108

Re: Logan Airport Parking Space Inventory

Dear Ms. Kirby:

In compliance with the reporting requirements of 310 CMR 7.30(3)(a), enclosed please find the Massachusetts Port Authority (Massport) submissions for the Logan Airport (the Airport) Parking Space Inventory:

- Commercial Parking Space Inventory;
- Employee Parking Space Inventory; and
- Location Map.

The attachments provide the quantity, physical distribution, and allocation of commercial and employee parking spaces on the Airport, as defined by 310 CMR 7.30, as amended, effective as of June 30, 2017. These inventory tables represent information provided by the Aviation Department and are supported by comprehensive field checks and counts conducted in September, 2018.

The Commercial Parking Space Inventory totals 23,640 parking spaces; the Employee Parking Space Inventory totals 2,448 parking spaces; and the total inventory of parking spaces at the Airport is 26,088. The in-service commercial parking spaces total 18,273 and the in-service employee parking spaces total 2,448 spaces. The current supply of in-service commercial spaces has been reduced by closing of the 367 space Blue Lot for construction of a relocated taxi pool. Additionally, for your information, we continue to provide information on rental car parking spaces, also attached.

The attached Logan Airport Parking Space Inventory reflects Massport's successful management of its parking program, within the requirements of 310 CMR 7.30, as amended.

If you have any questions, please call me at 617-568-3689.

Sincerely,

Hayes Morrison
Deputy Director - Maritime, Land Use, and Transportation Planning
Strategic & Business Planning Department

cc: D. Conroy, EPA
L. Gilmore, MPA
S. Dalzell, MPA
M. Kalowski, MPA

Commercial Parking Spaces

Old Map ID#	Map ID#	Location of Commercial Parking Areas	Sep-18 Number of Spaces
	Terminal Area and Economy Spaces		
C1a	C1	Central Garage	7179
C1b	C2	West Garage	3076
		West Garage Expansion	1699
C2	C3	Terminal B Garage	2212
C8a	C5	Terminal E Lot 1	237
C8b	C6	Terminal E Lot 2	249
C9	C7	Terminal E Lot 3 (fka "Gulf Station" Lot)	217
	C12	Blue Lot	0
C6	C8	Economy Garage	2864
		subtotal	17733
	Overflow Commercial Spaces		
	C11	Red Lot (Tomahawk Dr.)	
	C13	Green Lot (Wood Island)	
		subtotal	0
	Hotel Spaces		
C4	C4a ~~& C4b~~	Logan Airport Hilton Hotel (one lot)	235
C7a	C10	Harborside Hyatt Conference Center	270
		subtotal	505
	General Aviation Spaces		
C5	C9	Signature (General Aviation Terminal)	35
		subtotal	35

Total In-Service Commercial Parking Spaces	**18,273**
Total Designated Commercial Parking Spaces	**5,367**
Total Commercial Parking Spaces	**23,640**
Total Employee Parking Spaces *(see table on next page)*	**2,448**
TOTAL PARKING FREEZE SPACES	**26,088**

Employee Parking Spaces

Sep-18

Area		Map ID#	Location of Employee Parking Areas	Number of Spaces
Terminal	Terminal Area	E81	West Garage	98
Terminal		E26	Airport Tower/Administration (parking in Central Garage)	521
Terminal		E20	Terminal C Pier A (Old Terminal D) (two lots)	122
Terminal		E18	Massport Facilities 1 (Heating Plant)	92
Terminal		E34	Hilton Hotel employee lot	28
Terminal		E86	Gulf Gas Station	4
North	North Service Area	E68a	LSG Sky Chefs (Bldg. 68), main lot	25
North		E68b	LSG Sky Chefs (Bldg. 68), overflow lot	126
North		E1	Flight Kitchen Building 1 (and nearby lot)	80
North		E40	Lovell Street Lot (contractor trailer)	25
North		E53	Green Bus Depot (Bus Maintenance Facility)	12
North		E11a	North Cargo Building 11, TSA lot	93
North		E11b	North Cargo Building 11, State Police lot	136
North		E43	North Gate & EMS Trailer (EMS Station A7)	21
North		E8	North Cargo Building 8	114
North		E5	US Airways Administration/Hangar (Bldg. 5)	75
airside		*N/A*	Massport Facilities 2 (airside, Bldg. 3)	0
North		E4	Massport Facilities 3 (landside, Bldg. 4)	69
North		E13	UPS (Cargo Building 13)	44
North		E94	United Aircraft Maintenance (Buildings 93 & 94)	56
SW	SWSA	E59	Bus/Limo Pool Lot	4
SW		E60	Rental Car Center (Customer Service Center)	4
SW		E72	Taxi Pool Lot	8
South	South Service Area	E84	Bird Island Flats / Logan Office Center (LOC) Garage	416
South		E63	South Cargo Building 63	16
South		E62	South Cargo Building 62	43
South		E58	South Cargo Building 58	23
South		E57	South Cargo Building 57	44
South		E56	South Cargo Building 56	39
South		E78	Fire-Rescue HQ & Amelia Earhart Terminal/Hangar	84
airside		*N/A*	*ARFF Satellite Station* [1]	0

[1] This facility is located on the airfield and is not shown in the map. No employee parking spaces are provided.

Total In-Service Employee Parking Spaces	**2,422**
Total Designated Employee Parking Spaces	**26**
Total Employee Parking Spaces	**2,448**
Total Commercial Parking Spaces *(see table on previous page)*	**23,640**
TOTAL PARKING SPACES	**26,088**
TOTAL PARKING FREEZE SPACES	**26,088**

SUMMARY

TOTAL COMMERCIAL PARKING SPACES	***23,640***
TOTAL EMPLOYEE PARKING SPACES	***2,448***
TOTAL PARKING FREEZE SPACES	***26,088***

Rental Car Company Parking Spaces

Map ID#		Number of Spaces
R1	Rental Car Center (RCC)	5,020
Total Rental Car Spaces		**5,020**

Massachusetts Port Authority
One Harborside Drive, Suite 200-S
East Boston, MA 02128-2909
Telephone: 617-568-5000
www.massport.com

March 28, 2019

Christine Kirby, Director, Air & Climate Division
Massachusetts Department of Environmental Protection
Bureau of Air & Waste
One Winter Street
Boston, MA 02108

Re: Logan Airport Parking Space Inventory

Dear Ms. Kirby:

In compliance with the reporting requirements of 310 CMR 7.30(3)(a), enclosed please find the Massachusetts Port Authority (Massport) submissions for the Logan Airport (the Airport) Parking Space Inventory:

- Commercial Parking Space Inventory;
- Employee Parking Space Inventory; and
- Location Map.

The attachments provide the quantity, physical distribution, and allocation of commercial and employee parking spaces on the Airport, as defined by 310 CMR 7.30, as amended, effective as of June 30, 2017. These inventory tables represent information provided by the Aviation Department and are supported by comprehensive field checks and counts conducted in March, 2019.

The Commercial Parking Space Inventory totals 23,640 parking spaces; the Employee Parking Space Inventory totals 2,448 parking spaces; and the total inventory of parking spaces at the Airport is 26,088. The in-service commercial parking spaces total 18,273 and the in-service employee parking spaces total 2,448 spaces. There were no changes to the parking inventory between our last report in September 2018 and this current inventory. Additionally, for your information, we continue to provide information on rental car parking spaces, also attached.

The attached Logan Airport Parking Space Inventory reflects Massport's successful management of its parking program, within the requirements of 310 CMR 7.30, as amended.

Christine Kirby
March 28, 2019
Page 2

If you have any questions, please call me at 617-568-3689.

Sincerely,

Hayes Morrison
Deputy Director - Maritime, Land Use, and Transportation Planning
Strategic & Business Planning Department

cc: D. Conroy, EPA
L. Gilmore, MPA
S. Dalzell, MPA
C. McDonald, MPA

Commercial Parking Space Inventory
Logan International Airport
March 2019 Submission

Commercial Parking Spaces

Old Map ID#	Map ID#	Location of Commercial Parking Areas	Mar-19 Number of Spaces
	Terminal Area and Economy Spaces		
C1a	C1	Central Garage	7179
C1b	C2	West Garage	3076
		West Garage Expansion	1699
C2	C3	Terminal B Garage	2212
C8a	C5	Terminal E Lot 1	237
C8b	C6	Terminal E Lot 2	249
C9	C7	Terminal E Lot 3 (fka "Gulf Station" Lot)	217
	C12	Blue Lot	0
C6	C8	Economy Garage	2864
		subtotal	17733
	Overflow Commercial Spaces		
	C11	Red Lot (Tomahawk Dr.)	
	C13	Green Lot (Wood Island)	
		subtotal	0
	Hotel Spaces		
C4	C4a ~~& C4b~~	Logan Airport Hilton Hotel (one lot)	235
C7a	C10	Harborside Hyatt Conference Center	270
		subtotal	505
	General Aviation Spaces		
C5	C9	Signature (General Aviation Terminal)	35
		subtotal	35

Total In-Service Commercial Parking Spaces	**18,273**
Total Designated Commercial Parking Spaces	**5,367**
Total Commercial Parking Spaces	**23,640**
Total Employee Parking Spaces *(see table on next page)*	**2,448**
TOTAL PARKING FREEZE SPACES	**26,088**

Employee Parking Space Inventory
Logan International Airport
March 2019 Submission

Employee Parking Spaces

Area		Map ID#	Location of Employee Parking Areas	Mar-19 Number of Spaces
Terminal	Terminal Area	E81	West Garage	98
Terminal	Terminal Area	E26	Airport Tower/Administration (parking in Central Garage)	521
Terminal	Terminal Area	E20	Terminal C Pier A (Old Terminal D) (two lots)	122
Terminal	Terminal Area	E18	Massport Facilities 1 (Heating Plant)	92
Terminal	Terminal Area	E34	Hilton Hotel employee lot	28
Terminal	Terminal Area	E86	Gulf Gas Station	4
North	North Service Area	E68a	LSG Sky Chefs (Bldg. 68), main lot	25
North	North Service Area	E68b	LSG Sky Chefs (Bldg. 68), overflow lot	126
North	North Service Area	E1	Flight Kitchen Building 1 (and nearby lot)	80
North	North Service Area	E40	Lovell Street Lot (contractor trailer)	25
North	North Service Area	E53	Green Bus Depot (Bus Maintenance Facility)	12
North	North Service Area	E11a	North Cargo Building 11, TSA lot	93
North	North Service Area	E11b	North Cargo Building 11, State Police lot	136
North	North Service Area	E43	North Gate & EMS Trailer (EMS Station A7)	21
North	North Service Area	E8	North Cargo Building 8	114
North	North Service Area	E5	US Airways Administration/Hangar (Bldg. 5)	75
airside	North Service Area	*N/A*	Massport Facilities 2 (airside, Bldg. 3)	0
North	North Service Area	E4	Massport Facilities 3 (landside, Bldg. 4)	69
North	North Service Area	E13	UPS (Cargo Building 13)	44
North	North Service Area	E94	United Aircraft Maintenance (Buildings 93 & 94)	56
SW	SWSA	E59	Bus/Limo Pool Lot	4
SW	SWSA	E60	Rental Car Center (Customer Service Center)	4
SW	SWSA	E72	Taxi Pool Lot	8
South	South Service Area	E84	Bird Island Flats / Logan Office Center (LOC) Garage	416
South	South Service Area	E63	South Cargo Building 63	16
South	South Service Area	E62	South Cargo Building 62	43
South	South Service Area	E58	South Cargo Building 58	23
South	South Service Area	E57	South Cargo Building 57	44
South	South Service Area	E56	South Cargo Building 56	39
South	South Service Area	E78	Fire-Rescue HQ & Amelia Earhart Terminal/Hangar	84
airside		*N/A*	*ARFF Satellite Station* [1]	0

[1] This facility is located on the airfield and is not shown in the map. No employee parking spaces are provided.

Total In-Service Employee Parking Spaces	**2,422**
Total Designated Employee Parking Spaces	**26**
Total Employee Parking Spaces	**2,448**
Total Commercial Parking Spaces *(see table on previous page)*	**23,640**
TOTAL PARKING SPACES	**26,088**
TOTAL PARKING FREEZE SPACES	**26,088**

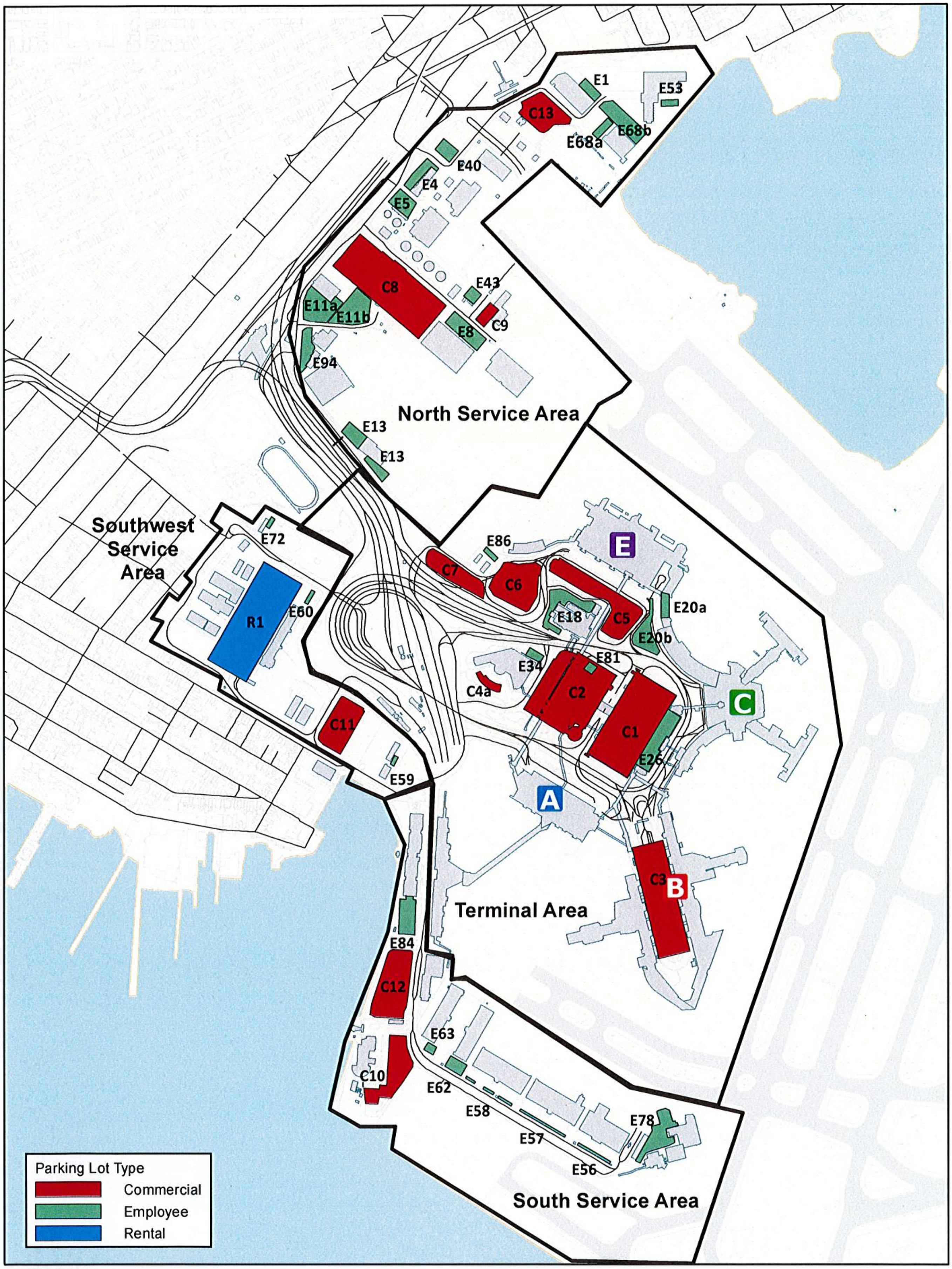
SUMMARY

TOTAL COMMERCIAL PARKING SPACES	***23,640***
TOTAL EMPLOYEE PARKING SPACES	***2,448***
TOTAL PARKING FREEZE SPACES	***26,088***

For Information Only:
Rental Car Spaces Inventory
Logan International Airport
March 2019 Submission

Rental Car Company Parking Spaces

Map ID#		Number of Spaces
R1	Rental Car Center (RCC)	5,020
Total Rental Car Spaces		**5,020**



Massachusetts Port Authority
Strategic and Business Planning
September 2016

Logan Airport Parking Space Inventory

N
0 0.075 0.15 0.3 Miles

Projection: Lambert Conformal Conic **Coordinate System:** NAD 1983 State Plane Massachusetts Mainland FIPS 2001 (Meter)

Massachusetts Port Authority
One Harborside Drive, Suite 200-S
East Boston, MA 02128-2909
Telephone: 617-568-5000
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September 20, 2019

Christine Kirby, Director, Air & Climate Division
Massachusetts Department of Environmental Protection
Bureau of Air & Waste
One Winter Street
Boston, MA 02108

Re: Logan Airport Parking Space Inventory

Dear Ms. Kirby:

In compliance with the reporting requirements of 310 CMR 7.30(3)(a), enclosed please find the Massachusetts Port Authority (Massport) submissions for the Logan Airport (the Airport) Parking Space Inventory:

- Commercial Parking Space Inventory;
- Employee Parking Space Inventory; and
- Location Map.

The attachments provide the quantity, physical distribution, and allocation of commercial and employee parking spaces on the Airport, as defined by 310 CMR 7.30, as amended, effective as of June 30, 2017. These inventory tables represent information provided by the Aviation Department and are supported by comprehensive field checks and counts conducted in September 2019.

The Commercial Parking Space Inventory totals 23,640 parking spaces; the Employee Parking Space Inventory totals 2,448 parking spaces; and the total inventory of parking spaces at the Airport is 26,088. The in-service commercial parking spaces total 17,041 and the in-service employee parking spaces total 2,445 spaces. The inventory of in-service spaces has changed since our last filing in March due to reconfiguration of both employee and commercial parking space locations to accommodate several ongoing and upcoming construction projects including: Terminal E project, Ride App (TNC) lot relocation, and relocation of the taxi pool. Additionally, for your information, we continue to provide information on rental car parking spaces, also attached.

The attached Logan Airport Parking Space Inventory reflects Massport's successful management of its parking program, within the requirements of 310 CMR 7.30, as amended.

Christine Kirby
September 20, 2019
Page 2

If you have any questions, please call me at 617-568-3689.

Sincerely,

Hayes Morrison
Deputy Director - Maritime, Land Use, and Transportation Planning
Strategic & Business Planning Department

cc: D. Conroy, EPA
L. Gilmore, MPA
M. Hadley, MPA
S. Dalzell, MPA
C. McDonald, MPA

Employee Parking Space Inventory
Logan International Airport
September 2019 Submission

Employee Parking Spaces

Area		Map ID#	Location of Employee Parking Areas	Sep-19 Number of Spaces
Terminal	Terminal Area	E81	West Garage	52
Terminal		E26	Airport Tower/Administration Parking	603
Terminal		E20	Terminal C Pier A (Old Terminal D) (two lots)	122
Terminal		E18	Massport Facilities 1 (Heating Plant)	92
Terminal		E34	Hilton Hotel employee lot	28
Terminal		E86	Nouria Gas Station	4
North	North Service Area	E68a	LSG Sky Chefs (Bldg. 68), main lot	25
North		E68b	LSG Sky Chefs (Bldg. 68), overflow lot	126
North		E1	Flight Kitchen Building 1 (and nearby lot)	80
North		E40	Lovell Street Lot (contractor trailer)	25
North		E53	Green Bus Depot (Bus Maintenance Facility)	12
North		E11a	North Cargo Building 11, TSA lot	93
North		E11b	North Cargo Building 11, State Police lot	136
North		E43	North Gate & EMS Trailer (EMS Station A7)	21
North		E8	North Cargo Building 8	114
North		E5	US Airways Administration/Hangar (Bldg. 5)	35
airside		*N/A*	Massport Facilities 2 (airside, Bldg. 3)	0
North		E4	Massport Facilities 3 (landside, Bldg. 4)	69
North		E13	UPS (E Lot 3)	41
North		E94	United Aircraft Maintenance (Buildings 93 & 94)	56
SW	SWSA	E59	Bus/Limo Pool Lot	4
SW		E60	Rental Car Center (Customer Service Center)	4
SW		E72	Taxi Pool Lot	8
South	South Service Area	E84	Bird Island Flats / Logan Office Center (LOC) Garage	416
South		E63	South Cargo Building 63	16
South		E62	South Cargo Building 62	43
South		E58	South Cargo Building 58	23
South		E57	South Cargo Building 57	44
South		E56	South Cargo Building 56	39
South		E78	Fire-Rescue HQ & Amelia Earhart Terminal/Hangar	114
airside		*N/A*	*ARFF Satellite Station* [1]	0

[1] This facility is located on the airfield and is not shown in the map. No employee parking spaces are provided.

Total In-Service Employee Parking Spaces	**2,445**
Total Designated Employee Parking Spaces	**3**
Total Employee Parking Spaces	**2,448**
Total Commercial Parking Spaces *(see table on previous page)*	**23,640**
TOTAL PARKING SPACES	**26,088**
TOTAL PARKING FREEZE SPACES	26,088

SUMMARY

TOTAL COMMERCIAL PARKING SPACES	***23,640***
TOTAL EMPLOYEE PARKING SPACES	***2,448***
TOTAL PARKING FREEZE SPACES	***26,088***

Commercial Parking Space Inventory
Logan International Airport
September 2019 Submission

Commercial Parking Spaces

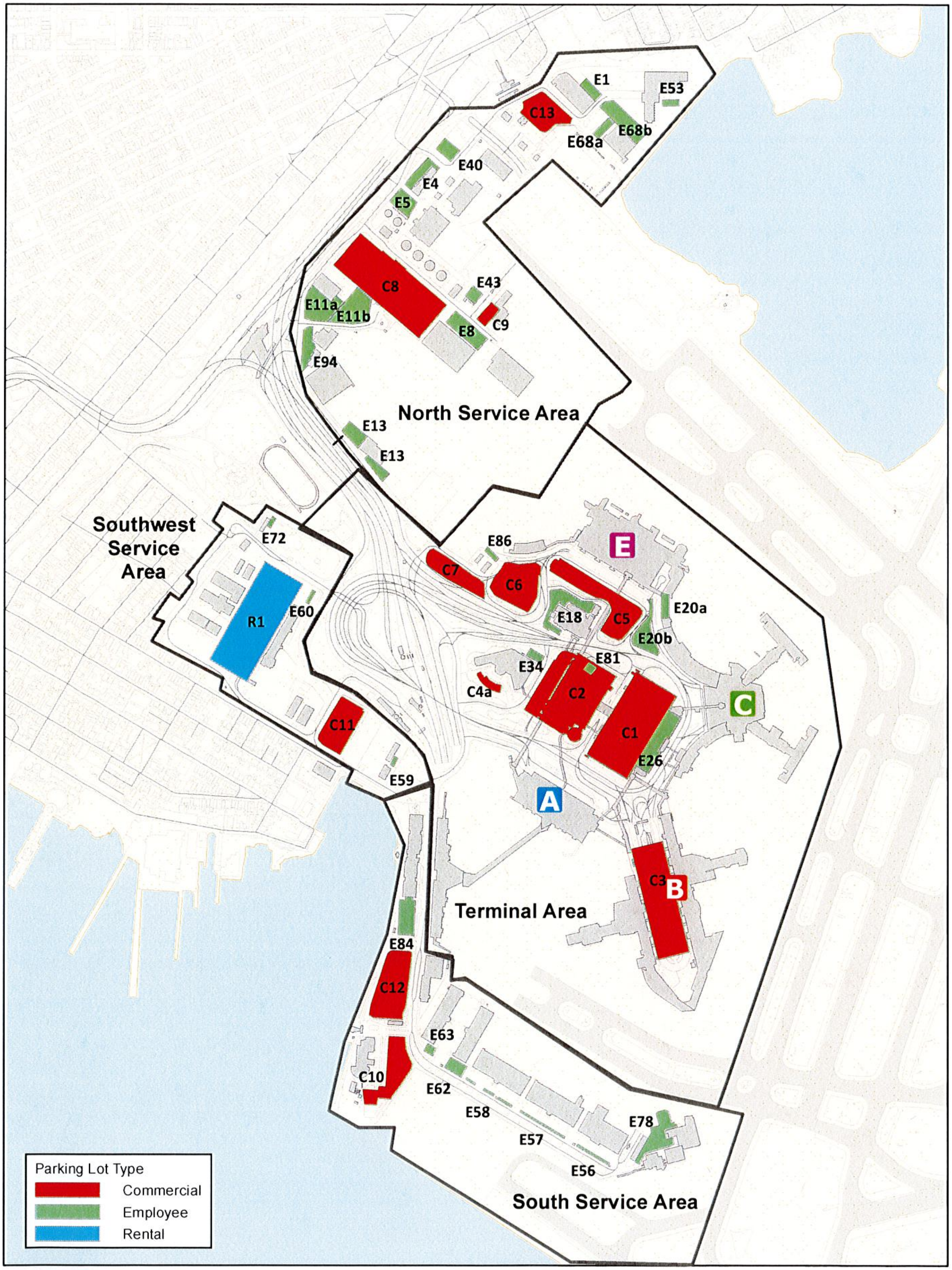
Old Map ID#	Map ID#	Location of Commercial Parking Areas	Sep-19 Number of Spaces
	Terminal Area and Economy Spaces		
C1a	C1	Central Garage	6311
C1b	C2	West Garage	2954
		West Garage Expansion	1699
C2	C3	Terminal B Garage	2212
C8a	C5	Terminal E Lot 1	237
C8b	C6	Terminal E Lot 2	203
C9	C7	Terminal E Lot 3 (fka "Gulf Station" Lot)	93
	C12	Blue Lot	0
C6	C8	Economy Garage	2864
		subtotal	16573
	Overflow Commercial Spaces		
	C11	Red Lot (Tomahawk Dr.)	100
	C13	Green Lot (Wood Island)	
		subtotal	100
	Hotel Spaces		
C4	C4a ~~& C4b~~	Logan Airport Hilton Hotel (one lot)	63
C7a	C10	Harborside Hyatt Conference Center	270
		subtotal	333
	General Aviation Spaces		
C5	C9	Signature (General Aviation Terminal)	35
		subtotal	35

Total In-Service Commercial Parking Spaces	**17,041**
Total Designated Commercial Parking Spaces	**6,599**
Total Commercial Parking Spaces	**23,640**
Total Employee Parking Spaces *(see table on next page)*	**2,448**
TOTAL PARKING FREEZE SPACES	**26,088**

For Information Only:
Rental Car Spaces Inventory
Logan International Airport
September 2019 Submission

Rental Car Company Parking Spaces

Map ID#		Number of Spaces
R1	Rental Car Center (RCC)	5,020
Total Rental Car Spaces		**5,020**



Massachusetts Port Authority
Strategic and Business Planning
September 2016

Logan Airport Parking Space Inventory

0 0.075 0.15 0.3 Miles

Projection: Lambert Conformal Conic Coordinate System: NAD 1983 State Plane Massachusetts Mainland FIPS 2001 (Meter)

H

Noise Abatement

This appendix provides detailed information, tables, and figures in support of Chapter 6, *Noise Abatement*. The contents of this appendix are summarized below.

Appendix Contents

Fundamentals of Acoustics and Environmental Noise

This section introduces the fundamentals of acoustics and noise terminology as well as the effects of noise on human activity and community annoyance.

Introduction to Acoustics and Noise Terminology

Chapter 6, *Noise Abatement* of this *2018/2019 Environmental Data Report (EDR)* relies largely on a measure of cumulative noise exposure over an entire calendar year, in terms of a metric called the Day-Night Average Sound Level (DNL). However, DNL does not always provide a sufficient description of noise for many purposes. Other measures are available to address essentially any issue of concern. This section introduces the following acoustic metrics, which are all related to DNL, but provide bases for evaluating a broad range of noise situations. These metrics include:

- Decibel (dB)
- A-Weighted Decibel (dBA)
- Sound Exposure Level (SEL)
- Equivalent Sound Level (Leq)

- Time Above (TA)
- Time Above, Night (TAN)
- DNL

The Decibel (dB)

All sounds come from a sound source – a musical instrument, a voice speaking, or an airplane that passes overhead. It takes energy to produce sound. The sound energy produced by any sound source is transmitted through the air in the form of sound waves – tiny, quick oscillations of pressure just above and just below atmospheric pressure. These oscillations, or sound pressures, impinge on the ear, creating the sound we hear.

Our ears are sensitive to a wide range of sound pressures. The loudest sounds that we hear without pain have about one million times more energy than the quietest sounds we hear. However, our ears are incapable of detecting small differences in these pressures. Thus, to match how we hear this sound energy, we compress the total range of sound pressures to a more meaningful range by introducing the concept of sound pressure level (SPL). SPL is a measure of the sound pressure of a given noise source relative to a standard reference value (typically the quietest sound that a young person with good hearing can detect). SPLs are measured in decibels (abbreviated dB). Decibels are logarithmic quantities – logarithms of the squared ratio of two pressures, the numerator being the pressure of the sound source of interest, and the denominator being the reference pressure (the quietest sound we can hear).

The logarithmic conversion of sound pressure to SPL means that the quietest sound we can hear (the reference pressure) has a SPL of about zero dB, while the loudest sounds we hear without pain have SPLs of about 120 dB. Most sounds in our day-to-day environment have SPLs from 30 to 100 dB.

Because decibels are logarithmic quantities, they do not behave like regular numbers with which we are more familiar. For example, if two sound sources each produce 100 dB and they are operated together, they produce only 103 dB – not 200 dB as we might expect. Four equal sources operating simultaneously result in a total SPL of 106 dB. In fact, for every doubling of the number of equal sources, the SPL goes up another three decibels. A tenfold increase in the number of sources makes the SPL go up 10 dB. A hundredfold increase makes the level go up 20 dB, and it takes a thousand equal sources to increase the level 30 dB.

If one source is much louder than another source, the two sources together will produce the same SPL (and sound to our ears) as if the louder source were operating alone. For example, a 100-dB source plus an 80-dB source produces 100 dB when operating together. The louder source “masks” the quieter one, but if the quieter source gets louder, it will have an increasing effect on the total SPL. When the two sources are equal, as described above, they produce a level 3 dB above the sound of either one by itself.

From these basic concepts, note that one hundred 80 dB sources will produce a combined level of 100 dB; if a single 100-dB source is added, the group will produce a total SPL of 103 dB. Clearly, the loudest source has the greatest effect on the total decibel level.

A-Weighted Decibel (dBA)

Another important characteristic of sound is its frequency, or “pitch.” This is the rate of repetition of the sound pressure oscillations as they reach our ear. Formerly expressed in cycles per second, frequency is now expressed in units known as Hertz (Hz).

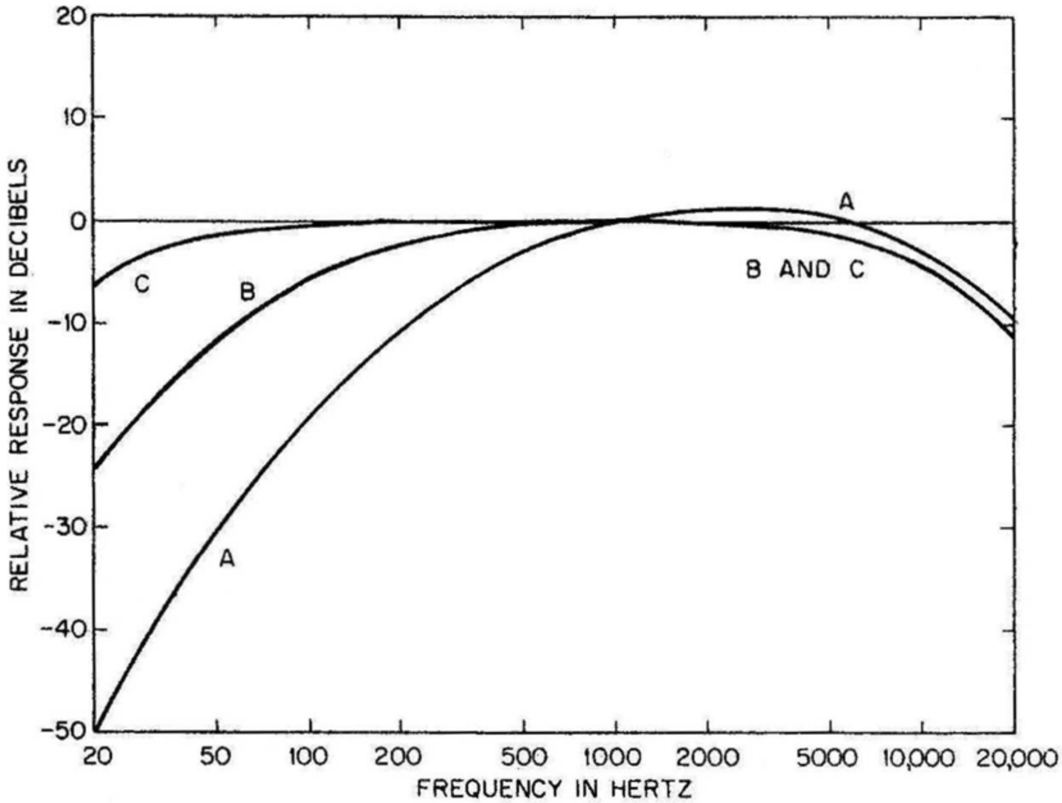
Most people hear from about 20 Hz to about 10,000 to 15,000 Hz. People respond to sound most readily when the predominant frequency is in the range of normal conversation, around 1,000 to 2,000 Hz. Acousticians have developed "filters" to match our ears' sensitivity and help us to judge the relative loudness of sounds made up of different frequencies. The so-called "A" filter does the best job of matching the sensitivity of our ears to most environmental noises. SPLs measured through this filter are referred to as A-weighted levels (dBA). A-weighting significantly de-emphasizes noise at low and very high frequencies (below about 500 Hz and above about 10,000 Hz) where we do not hear as well. Because this filter generally matches our ears' sensitivity, sounds having higher A-weighted sound levels are usually judged louder than those with lower A-weighted sound levels, a relationship which does not always hold true for unweighted levels. It is for these reasons that A-weighted sound levels are normally used to evaluate environmental noise.

Other weighting networks include the B and C filters. They correspond to different level ranges of the ear. The rarely used B-weighting attenuates low frequencies (those less than 500 Hz), but to a lesser degree than A-weighting. C weighting is nearly flat throughout the audible frequency range, hardly de-emphasizing low frequency noise. C-weighted levels can be preferable in evaluating sounds whose low-frequency components are responsible for secondary effects such as the shaking of a building, window rattle, or perceptible vibrations. Uses include the evaluation of blasting noise, artillery fire, and in some cases, aircraft noise inside buildings. **Figure H-1** compares these various weighting networks.

Because of the correlation with our hearing, the A-weighted level has been adopted as the basic measure of environmental noise by the U.S. Environmental Protection Agency (EPA) and by nearly every other federal and state agency concerned with community noise. **Figure H-2** presents typical A-weighted sound levels of several common environmental sources.

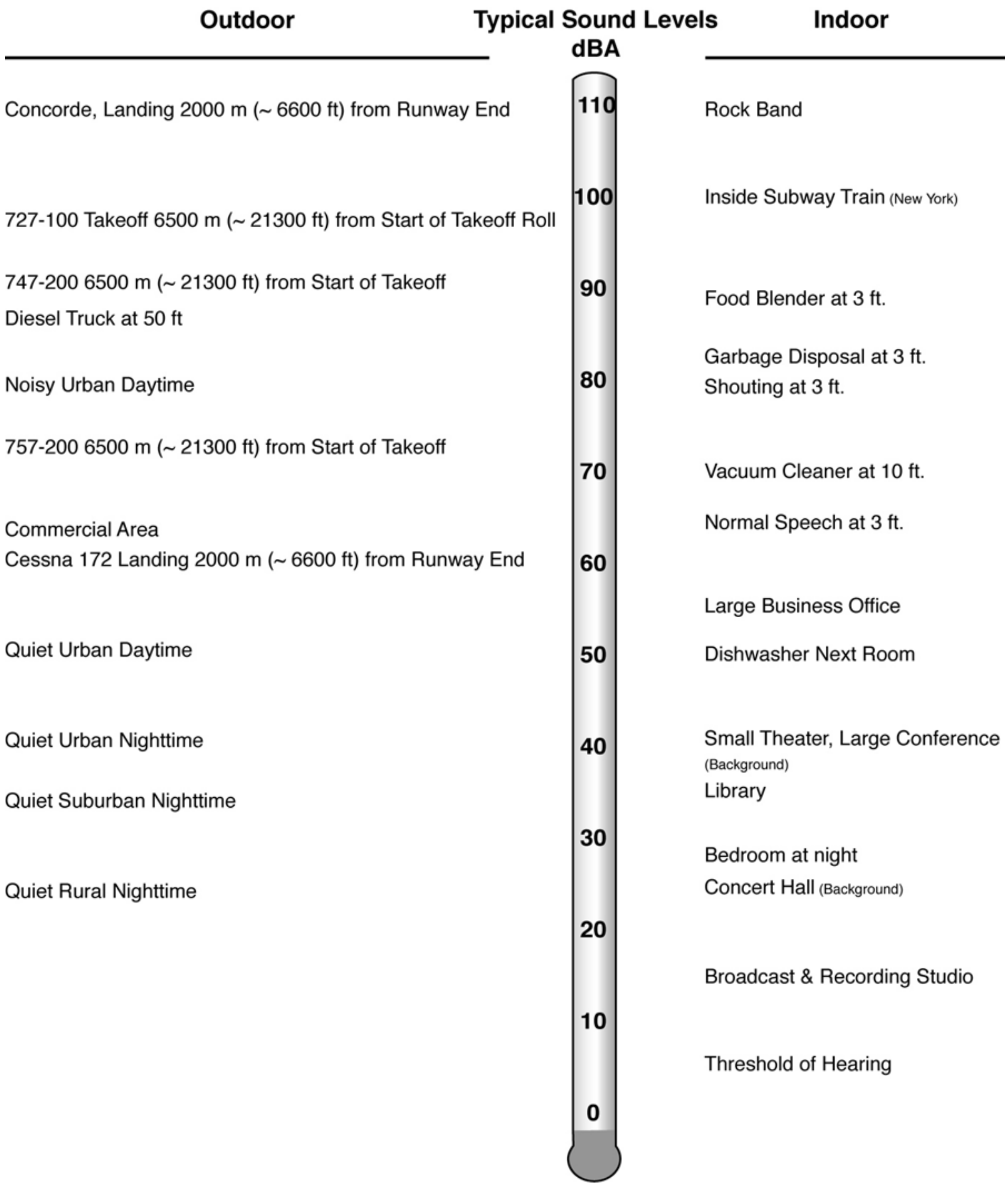
An additional dimension to environmental noise is that A-weighted levels vary with time. For example, the sound level increases as an aircraft approaches, then falls and blends into the background as the aircraft recedes into the distance (though even the background varies as birds chirp or the wind blows, or a vehicle passes by). **Figure H-3** illustrates this concept.

Figure H-1 Frequency-Response Characteristics of Various Weighting Networks



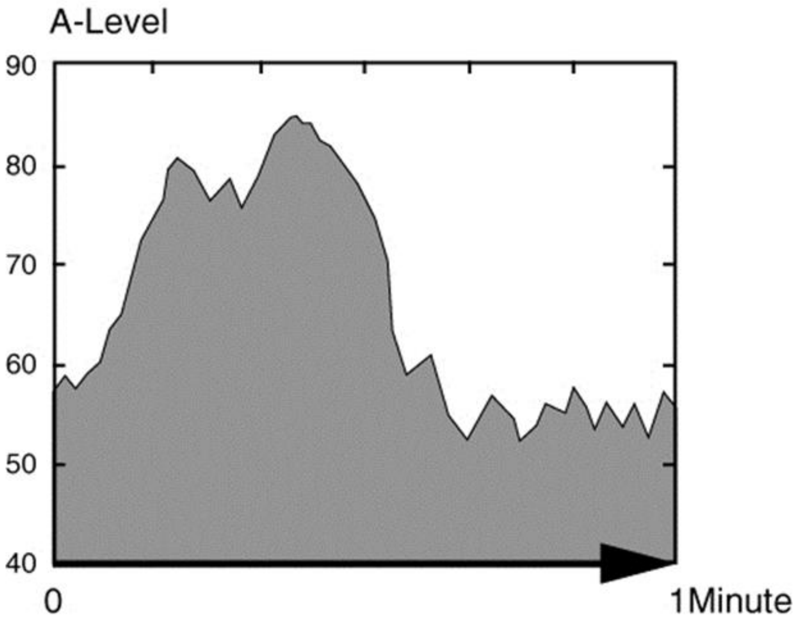
Source: Harris, Cyril M., editor; Handbook of Acoustical Measurements and Noise Control, (Chapter 5, "Acoustical Measurement Instruments"; Johnson, Daniel L.; Marsh, Alan H.; and Harris, Cyril M.); New York; McGraw-Hill, Inc.; 1991; p. 5.13.

Figure H-2 Common Environmental Sound Levels, in dBA



Source: HMMH (Aircraft noise levels from FAA Advisory Circular 36-3H)
Note: dBA – A-weighted decibel.

Figure H-3 Variations in the A-Weighted Sound Level Over Time



Source: HMMH.

Maximum A-Weighted Noise Level (L_{max})

The variation in noise level over time often makes it convenient to describe a particular noise "event" by its maximum sound level, abbreviated as L_{max}. In the figure above, it is approximately 85 dBA.

The maximum level describes only one dimension of an event; it provides no information on the cumulative noise exposure. In fact, two events with identical maxima may produce very different total exposures. One may be of very short duration, while the other may continue for an extended period and be judged much more annoying. The next measure corrects for this deficiency.

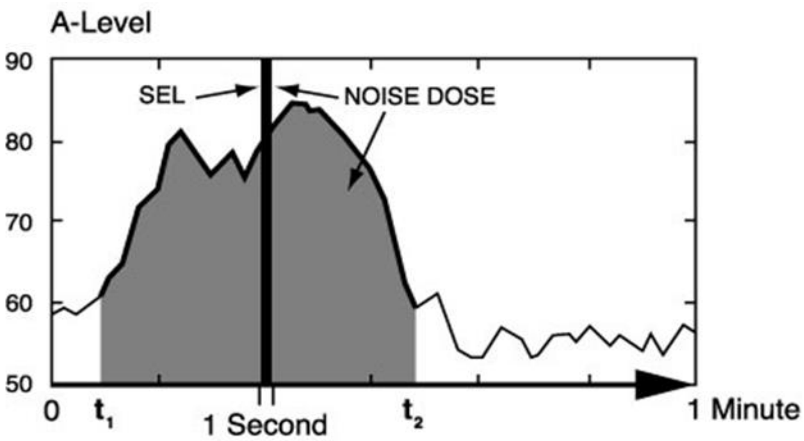
Sound Exposure Level (SEL)

The most frequently used measure of noise exposure for an individual aircraft noise event (and the measure that Part 150[1] specifies for this purpose) is the SEL. SEL is a measure of the total noise energy produced during an event, from the time when the A-weighted sound level first exceeds a threshold level (normally just above the background or ambient noise) to the time that the sound level drops back down below the threshold. To allow comparison of noise events with very different durations, SEL “normalizes” the duration in every case to one second; that is, it is expressed as the steady noise level with just a one-second duration that includes the same amount of noise energy as the actual longer duration, time-varying noise. In lay terms, SEL “squeezes” the entire noise event into one second.

1 “Part 150” refers to Federal Aviation Regulations (FAR) Part 150, discussed in detail in the Regulatory Framework Section of this Appendix.

Figure H-4 depicts this transformation. The shaded area represents the energy included in an SEL measurement for the noise event, where the threshold is set to 60 dBA. The dark shaded vertical bar, which is 90 dBA high and just one second long (wide), contains the same sound energy as the full event.

Figure H-4 Sound Exposure Level (SEL)



Source: HMMH.

Because the SEL is normalized to one second, it will always be larger than the L_{max} for an event longer than one second. In this case, the SEL is 90 dB; the L_{max} is approximately 85 dBA. For most aircraft overflights, the SEL is normally on the order of 7 to 12 dB higher than L_{max}. Because SEL considers duration, longer exposure to relatively slow, quiet aircraft, such as propeller models, can have the same or higher SEL than shorter exposure to faster, louder planes, such as corporate jets.

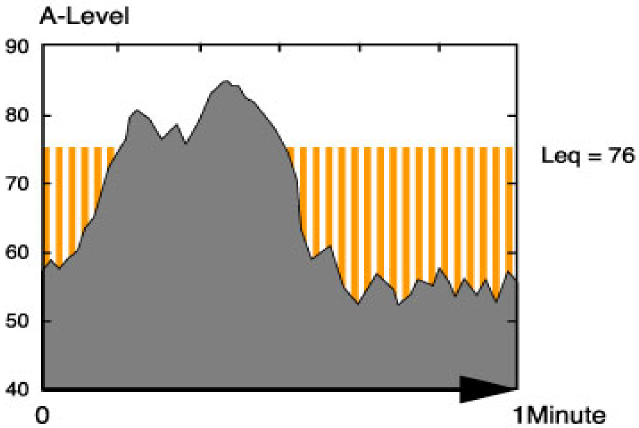
Equivalent Sound Level (L_{eq})

The L_{max} and SEL quantify the noise associated with individual events. The remaining metrics in this section describe longer-term cumulative noise exposure that can include many events.

The Equivalent Sound Level (L_{eq}) is a measure of exposure resulting from the accumulation of A-weighted sound levels over a particular period of interest (e.g., an hour, an eight-hour school day, nighttime, or a full 24-hour day). Because the length of the period can differ, the applicable period should always be identified or clearly understood when discussing the metric. Such durations are often identified through a subscript, for example $L_{eq(8)}$ or $L_{eq(24)}$.

L_{eq} is equivalent to the constant sound level over the period of interest that contains as much sound energy as the actual time-varying level. This is illustrated in **Figure H-5**. Both the solid and striped shaded areas have a one-minute L_{eq} value of 76 dB. It is important to recognize, however, that the two signals (the constant one and the time-varying one) would sound very different in real life. Also, be aware that the "average" sound level suggested by L_{eq} is not an arithmetic value, but a logarithmic, or "energy-averaged" sound level. Thus, loud events dominate L_{eq} measurements.

Figure H-5 Example of a One Minute Equivalent Sound Level (L_{eq})



Source: HMMH.

In airport noise studies, L_{eq} is often presented for consecutive one-hour periods to illustrate how the exposure rises and falls throughout a 24-hour period, and how individual hours are affected by unusual activity, such as rush hour traffic or a few loud aircraft.

Time Above (TA)

TA is a metric that gives the duration, in minutes, for which aircraft-related noise exceeds a specified A-weighted sound level during a given period. The measure is referred to generally as TA. For this *2018/2019 EDR*, three threshold sound levels are used in the analysis: 65, 75, and 85 dBA. These times are computed using the Federal Aviation Administration (FAA)-approved Aviation Environmental Design Tool (AEDT).

Time Above Night (TAN)

Identical to TA, except it is computed for only the 9-hour period between 10:00 PM and 7:00 AM. The TAN is also developed using three threshold sound levels 65, 75, and 85 dBA.

Day-Night Average Sound Level (DNL)

Virtually all studies of aircraft noise rely on a slightly more complicated measure of noise exposure that describes cumulative noise exposure during an average annual day: the DNL. The Environmental Protection Agency (EPA) identified DNL as the most appropriate means of evaluating airport noise based on the following considerations:[2]

1. The measure should be applicable to the evaluation of pervasive long-term noise in various defined areas and under various conditions over long periods.

2 Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," U. S. EPA Report No. 550/9-74-004, March 1974.

2. The measure should correlate well with known effects of the noise environment and on individuals and the public.

3. The measure should be simple, practical, and accurate. In principal, it should be useful for planning as well as for enforcement or monitoring purposes.

4. The required measurement equipment, with standard characteristics, should be commercially available.

5. The measure should be closely related to existing methods currently in use.

6. The single measure of noise at a given location should be predictable, within an acceptable tolerance, from knowledge of the physical events producing the noise.

7. The measure should lend itself to small, simple monitors, which can be left unattended in public areas for long periods.

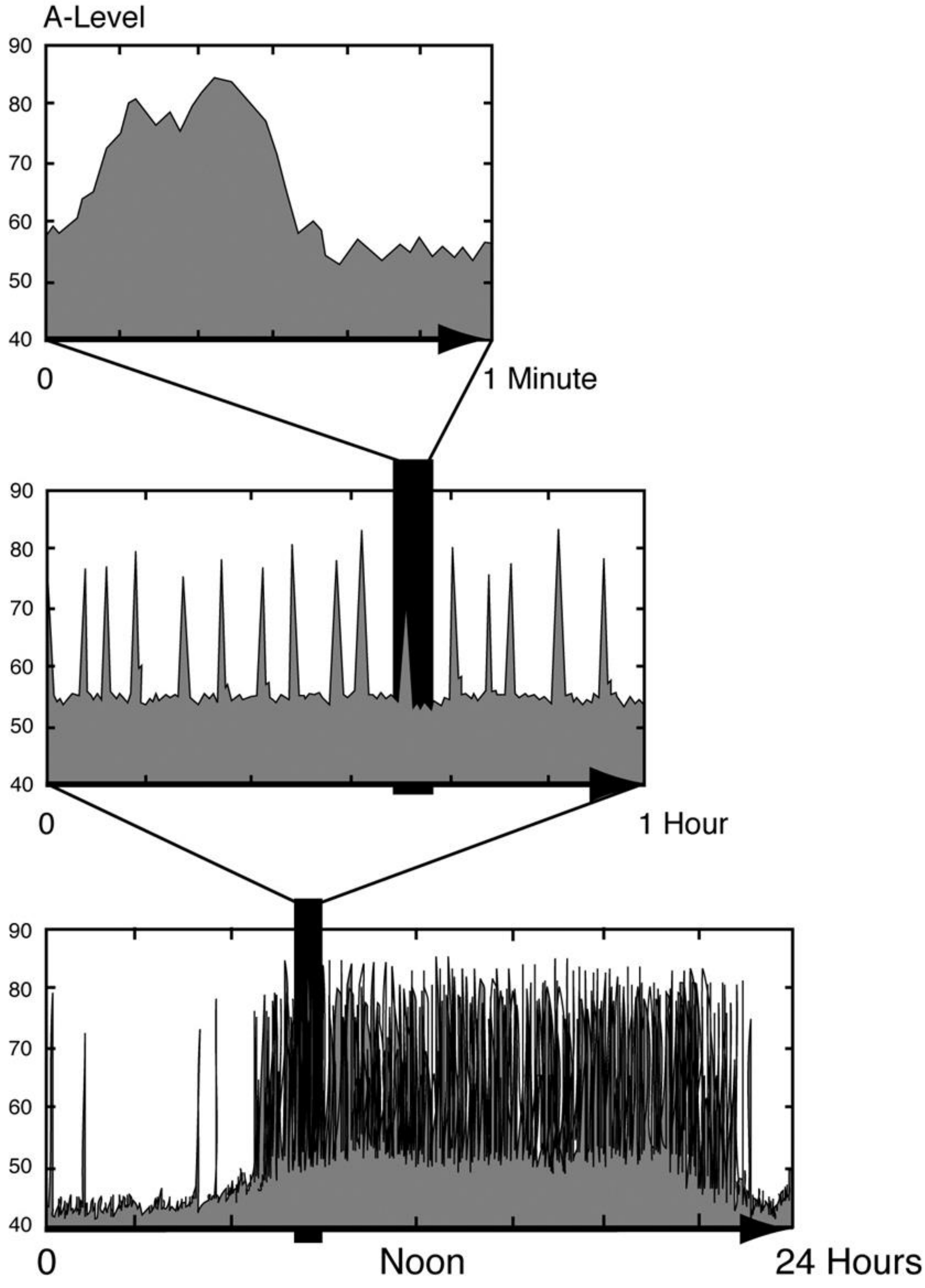
Most federal agencies dealing with noise have formally adopted DNL. The Federal Interagency Committee on Noise (FICON) reaffirmed the appropriateness of DNL in 1992. The FICON summary report stated; "There are no new descriptors or metrics of sufficient scientific standing to substitute for the present DNL cumulative noise exposure metric."

The DNL represents noise as it occurs over a 24-hour period, with one important exception: DNL treats nighttime noise differently from daytime noise. In determining DNL, it is assumed that the A-weighted levels occurring at night (defined as 10:00 PM to 7:00 AM) are 10 dB louder than they really are. This 10-dB penalty is applied to account for greater sensitivity to nighttime noise, and the fact that events at night are often perceived to be more intrusive because nighttime ambient noise is less than daytime ambient noise.

Figure H-4 illustrated the A-weighted sound level due to an aircraft fly-over as it changed with time. The top frame of **Figure H-6** repeats this figure. The shaded area reflects the noise dose that a listener receives during the one-minute period of the sample. The center frame of **Figure H-6** includes this one-minute sample within a full hour. The shaded area represents the noise during that hour with 16 noise events, each producing an SEL. Similarly, the bottom frame includes the one-hour interval within a full 24 hours. Here the shaded area represents the listener's noise dose over a complete day. Note that several overflights occur at a time when the background noise drops some 10 dB, to approximately 45 dBA.

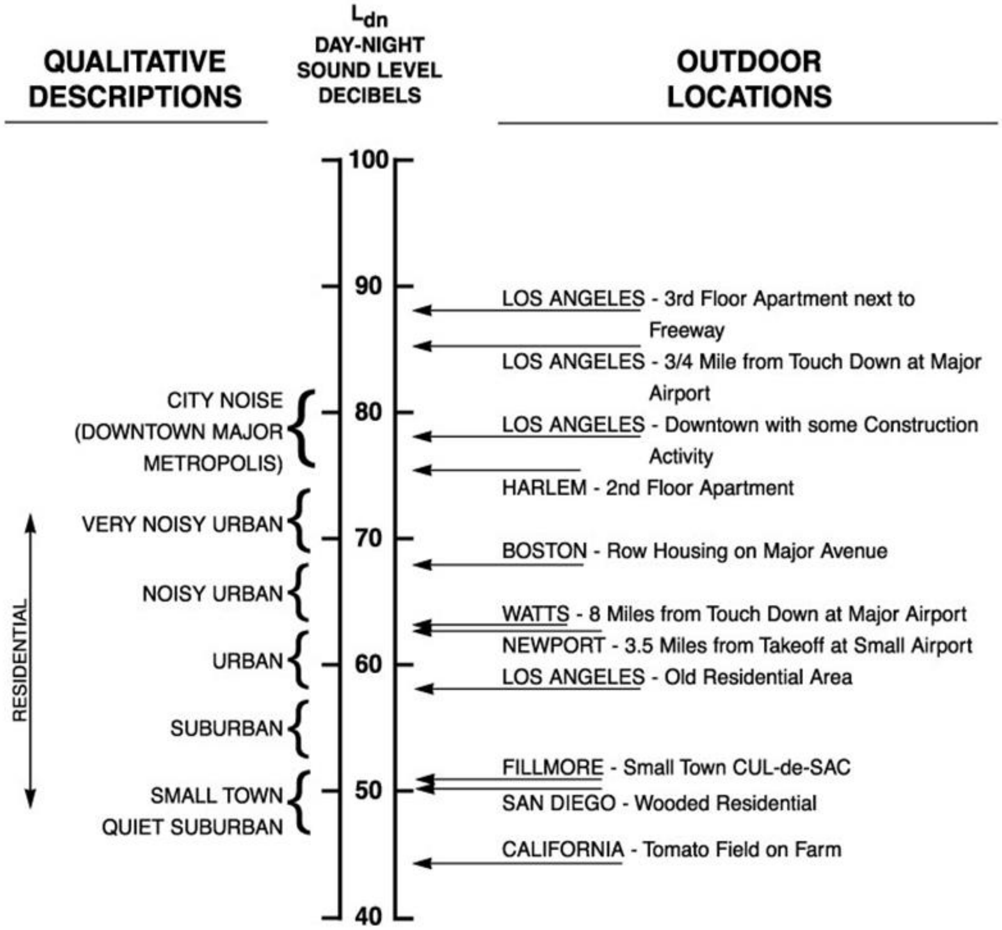
DNL can be measured or estimated. Measurements are practical only for obtaining DNL values for relatively limited numbers of points, and, in the absence of a permanently installed monitoring system, only for relatively short time periods. Most airport noise studies are based on computer-generated DNL estimates, determined by accounting for all the SELs from individual events, which comprise the total noise dose at a given location. Computed DNL values are often depicted in terms of equal-exposure noise contours (much as topographic maps have contours of equal elevation). **Figure H-7** depicts typical DNL values for a variety of noise environments.

Figure H-6 Daily Noise Dose



Source: HMMH.

Figure H-7 Examples of Day-Night Average Sound Levels (DNL)



Source: U.S. Environmental Protection Agency (EPA), Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974, p. 14.

In 2015, the FAA began a multi-year effort to update the scientific evidence on the relationship between aircraft noise exposure and its effects on communities around airports.[3] This was the most comprehensive study using a single noise survey ever undertaken in the United States, polling communities surrounding 20 airports nationwide. The FAA Reauthorization Act of 2018 under Section 188 and 173, required FAA to complete the evaluation of alternative metrics to the DNL standard within one year. The Section 188 and 173 Report to Congress was delivered on April 14, 2020[4] and concluded that while no single noise metric can cover all situations, DNL provides the most comprehensive way to consider the range of factors influencing exposure to aircraft noise. In addition, use of supplemental metrics is both encouraged and supported to further disclose and aid in the public understanding of community noise impacts. The full

3 Federal Aviation Administration. Press Release – FAA To Re-Evaluate Method for Measuring Effects of Aircraft Noise. https://www.faa.gov/news/press_releases/news_story.cfm?newsId=18774

4 Federal Aviation Administration. Report to Congress on an evaluation of alternative noise metrics. https://www.faa.gov/about/plans_reports/congress/media/Day-Night_Average_Sound_Levels_COMPLETED_report_w_letters.pdf

study supporting these reports is expected to be released in the fall of 2020. If changes are warranted in the use of DNL, which DNL level to assess or the use of supplemental metrics, FAA will propose revised policy and related guidance and regulations, subject to interagency coordination, as well as public review and comment.

The Effects of Aircraft Noise on People

To residents around airports, aircraft noise can be an annoyance and a nuisance. It can interfere with conversation and listening to television, it can disrupt classroom activities in schools, and it can disrupt sleep. Relating these effects to specific noise metrics helps in the understanding of how and why people react to their environment.

Speech Interference

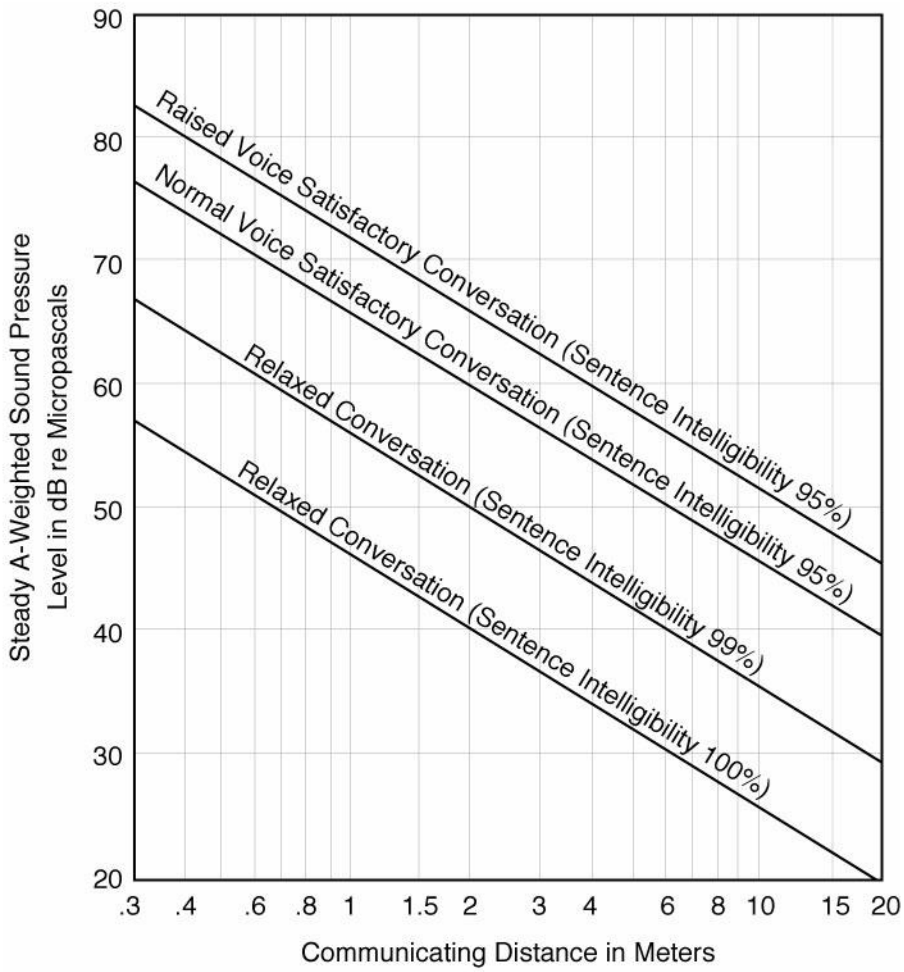
A primary effect of aircraft noise is its tendency to drown out or "mask" speech, making it difficult to carry on a normal conversation. The sound level of speech decreases as the distance between a talker and listener increases. As the background sound level increases, it becomes harder to hear speech. **Figure H-8** presents typical distances between talker and listener for satisfactory outdoor conversations, in the presence of different steady A-weighted background noise levels for raised, normal, and relaxed voice effort. As the background level increases, the talker must raise his/her voice, or the individuals must get closer together to continue talking.

As indicated in the figure, "satisfactory conversation" does not always require hearing every word; 95 percent intelligibility is acceptable for many conversations. Listeners can infer a few unheard words when they occur in a familiar context. However, in relaxed conversation, we have higher expectations of hearing speech and generally require closer to 100 percent intelligibility. Any combination of talker-listener distances and background noise that falls below the bottom line in **Figure H-8** (thus assuring 100 percent intelligibility) represents an ideal environment for outdoor speech communication and is considered necessary for acceptable indoor conversation as well.

One implication of the relationships in **Figure H-8** is that for typical communication at distances of 3 or 4 feet (1 to 1.5 meters), acceptable outdoor conversations can be carried on in a normal voice as long as the background noise outdoors is less than about 65 dBA. If the noise exceeds this level, as might occur when an aircraft passes overhead, intelligibility would be lost unless vocal effort were increased, or communication distance were decreased.

Indoors, typical distances, voice levels, and intelligibility expectations generally require a background level less than 45 dBA. With windows partly open, housing generally provides about 12 dBA of interior-to-exterior noise level reduction. Thus, if the outdoor sound level is 60 dBA or less, there is a reasonable chance that the resulting indoor sound level will afford acceptable conversation inside. With windows closed, 24 dB of attenuation is typical.

Figure H-8 Outdoor Speech Intelligibility



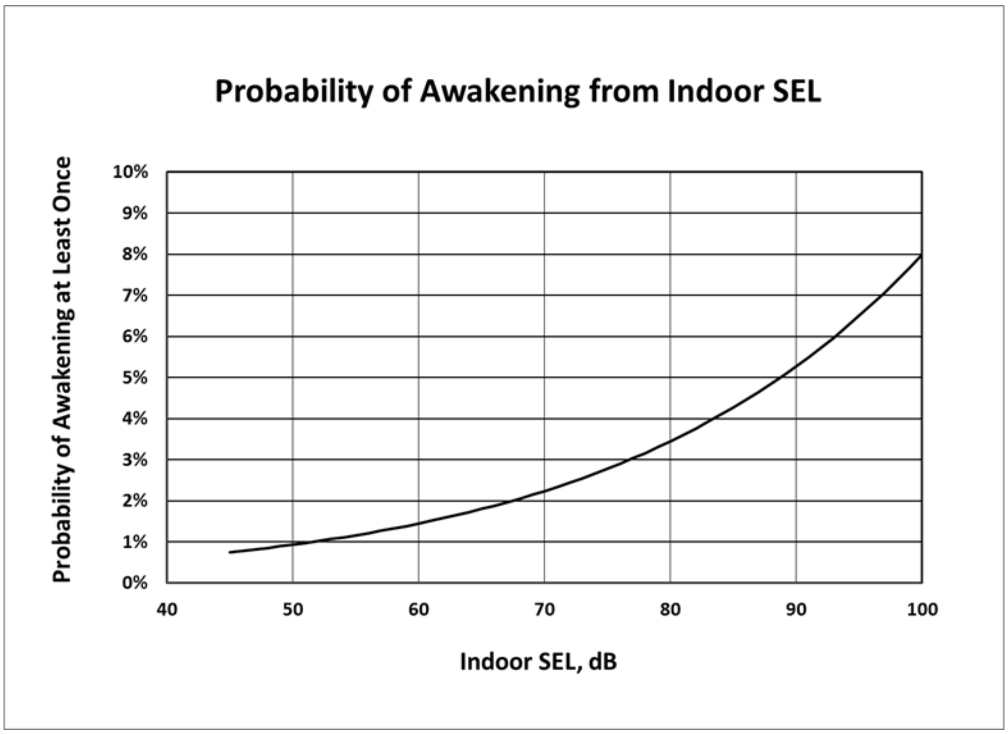
Source: U.S. Environmental Protection Agency (EPA), Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety, March 1974, p. D-5.

Sleep Interference

Research on sleep disruption from noise has led to widely varying observations. In part, this is because (1) sleep can be disturbed without awakening, (2) the deeper the sleep the more noise it takes to cause arousal, and (3) the tendency to awaken increases with age, and other factors. **Figure H-9** shows one such relationship from recent research conducted in the U.S. – the probability that a group of people will be awakened at least once when exposed to a given indoor SEL.

For example, an indoor SEL of 80 dB results in approximately 3.5 percent of the exposed population being awakened. If windows are open in the bedroom on a warm evening and a house provides a typical outside-to-inside noise level reduction of around 15 dB, which suggests it takes an SEL of about 95 dB outdoors to awaken 3.5 percent of the population. The American National Standards Institute (ANSI) has extended this concept further and developed a standard (ANSI S12.9-2008/Part 6) for computing the percentage of the population that is likely to be awakened by multiple noise events occurring throughout the night. The Federal Interagency Committee on Aviation Noise (FICAN) subsequently endorsed the standard as the best available means of estimating behavioral awakenings from aircraft noise.

Figure H-9 Probability of Awakening at Least Once from Indoor Noise Event



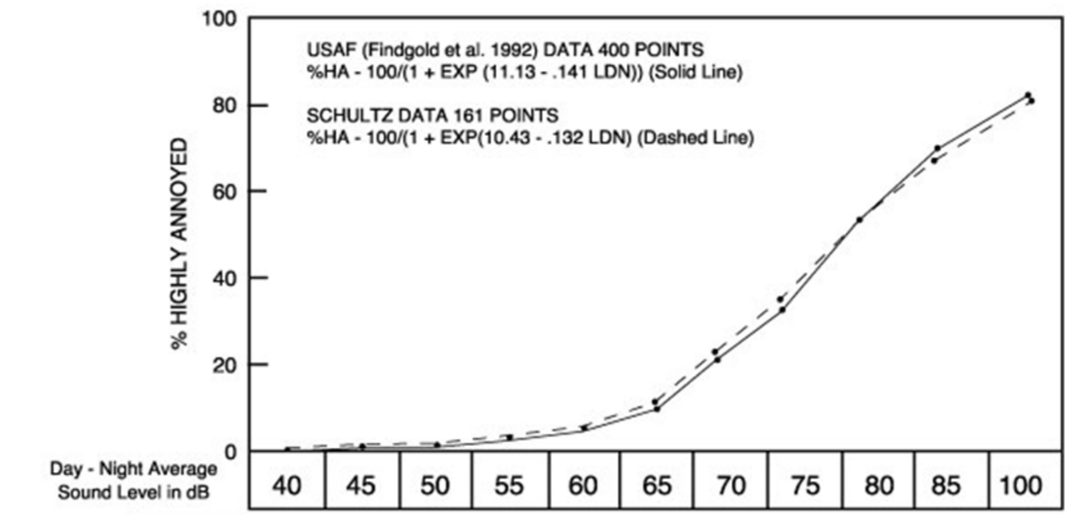
Source: American National Standards Institute (ANSI) S12.9-2008/Part 6, Quantities and Procedures for Description and Measurement of Environmental Sound — Part 6: Methods for Estimation of Awakenings Associated with Outdoor Noise Events Heard in Homes; Equation 1.

Community Annoyance

Social survey data make it clear that individual reactions to noise vary widely for a given noise level. Nevertheless, as a group, people's aggregate response is predictable and relates well to measures of cumulative noise exposure such as DNL. **Figure H-10** shows a widely recognized relationship between environmental noise and annoyance. Based on data from 18 surveys conducted worldwide, the curve indicates that at levels as low as DNL 55, approximately 5.0 percent of the people will still be highly annoyed, with the percentage increasing more rapidly as exposure increases above DNL 65 dB.

Separate work by the EPA has shown that overall community reaction to a noise environment can also be related to DNL. This relationship is shown in **Figure H-11**. Levels have been normalized to the same set of exposure conditions to permit valid comparisons between ambient noise environments. Data summarized in **Figure H-11** suggest that little reaction would be expected for intrusive noise levels five decibels below the ambient, while widespread complaints can be expected as intruding noise exceeds background levels by about 5 dB. Vigorous action is likely when the background is exceeded by 20 dB.

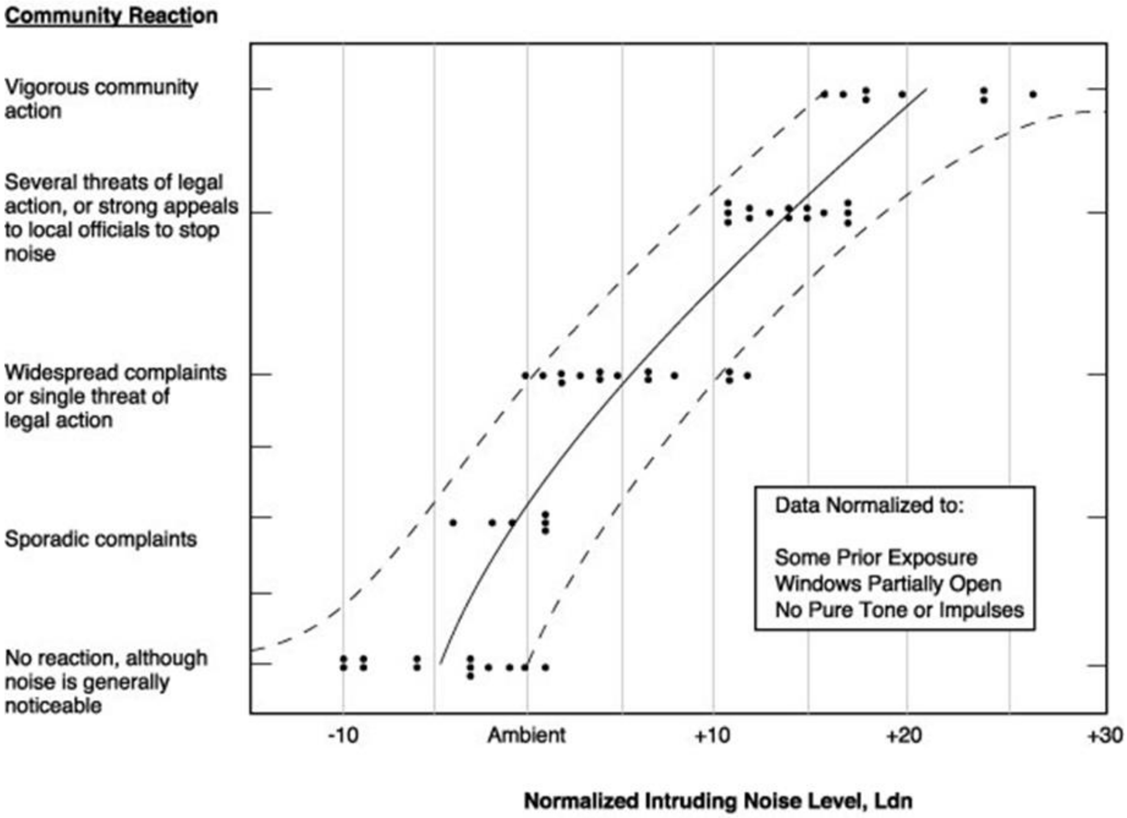
Figure H-10 Percentage of People Highly Annoyed



Calculated %HA Points											
USAF	0.41	0.831	1.66	3.31	6.48	12.29	22.1	36.47	53.74	70.16	82.64
SCHULTZ	0.576	1.11	2.12	4.03	7.52	13.59	23.32	37.05	53.25	68.78	81

Source: Federal Interagency Committee on Aviation Noise (FICON). "Federal Agency Review of Selected Airport Noise Analysis Issues." August 1992. (From data provided by USAF Armstrong Laboratory). pp. 3-6.

Figure H-11 Community Reaction as a Function of Outdoor DNL



Source: Wyle Laboratories, "Community Noise," prepared for the U.S. Environmental Protection Agency, Office of Noise Abatement and Control, Washington, D.C., December 1971, pg. 63.
Note: DNL - Day-Night Average Sound Level.

Regulatory Framework

Logan Airport Noise Abatement Rules and Regulations

Massport's primary mechanism for reducing noise impacts from Logan Airport's operations is the Noise Rules.[5] The Noise Rules were designed to reduce noise impacts by encouraging use of quieter aircraft by requiring decreased use of noisier aircraft and by limiting nighttime activity by louder Stage 2 types. Many secondary goals aimed at limiting noise in specific areas also were stated.

Specific provisions of the Noise Rules, which continue to serve these goals, include:

- Limiting cumulative noise exposure at Logan Airport (as measured by Massport's cumulative noise index [CNI]) to a maximum of 156.5 Effective Perceived Noise Decibels (EPNdB);
- Maximizing use of Stage 3 aircraft;
- Restricting nighttime operations by Stage 2 aircraft;

5 The Logan International Airport Noise Abatement Rules and Regulations, effective July 1, 1986, are codified at 740 Code of Massachusetts Regulations (CMR) 24.01 et seq (also known as the Noise Rules).

- Placing limitations on times and locations of engine run-ups and use of auxiliary power units (APU); and
- Restricting use of certain runways by noisier aircraft and time of day.

These restrictions and limitations are subject to FAA implementation and safe operation of the Airport and airspace.

Federal Aviation Regulation (FAR) Part 36

Logan Airport operates within a framework of federal aviation regulations that limits an airport operator's ability to control noise. For example, FAA's FAR Part 36[6] sets noise limits for aircraft certification and the procedures by which aircraft noise emission levels must be measured to determine compliance. The regulation defines noise emission limits for turbojets, turboprops, and helicopters, classifying turbojets into categories referred to as stages based on noise levels at each of three locations: takeoff, landing, and to the side of the runway during takeoff (sideline). The categories are:

- Stage 1 aircraft are the oldest and usually have the loudest operations, having preceded the existence of any noise emission regulation. Rare examples include old, restored civil or military aircraft. There are no Stage 1 aircraft operating at Logan Airport.
- Stage 2 aircraft are less old and less noisy than Stage 1; they were the first aircraft types required to meet a noise limit. A subsequent regulation, FAR Part 91 (described below), prohibits the operation of a Stage 2 aircraft in the continental U.S. unless its takeoff weight is 75,000 pounds or less. FAA Reauthorization bill of 2012 also mandated the phase out of Stage 2 aircraft with a takeoff weight less than 75,000 pounds by the end of 2015. Thus, there are no longer any Stage 2 aircraft operating at Logan Airport.
- Stage 3 aircraft were certified for service before 2006 and have relatively quiet jets, although some are Stage 2 aircraft that have been re-engined, or have been fitted with hushkits, enabling them to meet Stage 3 noise limits.
- Stage 4 aircraft are required to operate with a cumulative noise level at least 10 dB quieter than Stage 3 aircraft at three prescribed measurement points. Jet aircraft certificated after January 1, 2006 must meet the Stage 4 limits. Although not required, the majority of aircraft in the 2018 and 2019 Logan Airport fleets would also meet the Stage 4 noise limits if they were recertificated.
- Stage 5 aircraft are the newest and quietest aircraft. All aircraft certificated after January 1, 2018 must meet Stage 5 limits, which are a cumulative 7 dB below Stage 4 and 17 dB below Stage 3 aircraft. The Boeing 787, 747-8, and Airbus A350 and A380 are examples of aircraft that meet the new limits. About 15 percent of aircraft in the 2018 and 2019 Logan Airport fleets would meet Stage 5 noise limits.

6 14 CFR Part 36, "Noise Standards: Aircraft Type and Air Worthiness Certification."

FAR Part 150

First implemented in February 1981, FAR Part 150[7] defines procedures that an airport operator must follow if it chooses to conduct and implement an airport noise and land use compatibility plan. Part 150 Noise Compatibility studies require the use of DNL to evaluate the airport noise environment. FAR Part 150 identifies noise compatibility guidelines for different land uses depending on their sensitivity. Key values include a DNL of 75 dB, above which no residences, schools, hospitals, or churches are considered compatible, and a DNL of 65 dB, above which those land uses are considered compatible only if they are sound insulated.

Noise abatement or mitigation measures that an airport operator must consider in a Part 150 study include acquisition of incompatible land, construction of noise barriers, sound insulation of buildings, implementation of a preferential runway program, use of noise abatement flight tracks, implementation of airport use restrictions, and any other actions that would have a beneficial effect on the public.

While Massport has implemented variations of these and additional measures at Logan Airport, Massport has not filed an official Part 150 noise compatibility study with FAA because all of Logan Airport's program elements, while regularly reviewed and updated, preceded the promulgation of Part 150 and are effectively grandfathered under the regulation.

FAR Parts 91 and 161

The Airport Noise and Capacity Act of 1990 (ANCA)[8] directed the U.S. Secretary of Transportation to undertake three key noise-related actions:

- Establish a schedule for a phase out of Part 36 Stage 2 aircraft by the year 2000
- Establish a program for FAA review of all new airport noise and access restrictions limiting operations of Stage 2 aircraft: and
- Establish a program for FAA review and approval of any restriction that limits operations of Stage 3 aircraft, including public notice requirements.

FAA addressed these requirements through amendment of an existing federal regulation, "Part 91,"[9] and establishment of a new regulation, "Part 161."[10] ANCA effectively ended Massport's pursuit of any additional operational restrictions outside of this program.

Amendment to Part 91

FAA establishes and regulates operating noise limits for civil aircraft operation in Subpart I, "Operating Noise Limits," of 14 CFR Part 91, "General Operating and Flight Rules." The noise limits are based on aircraft noise certification criteria set forth in 14 CFR Part 36, described above.

In 1976, FAA ordered a phase out of all Stage 1 aircraft with a maximum gross takeoff weight (MGTOW) over 75,000 pounds, to be completed on January 1, 1985. After that date, Stage 1 civil aircraft over

7 14 CFR Part 150, "Airport Noise Compatibility Planning."
8 Pub. L. No. 101-508, 104 Stat. 1388, as recodified at 49 United States Code 47521- 47533.
9 14 CFR Part 91, "General Operating and Flight Rules."
10 14 CFR Part 161, "Notice and Approval of Airport Noise and Access Restrictions."

75,000 pounds MGTOW were banned from operating in the U.S. (with limited exemptions related to commercial service at "small communities," which has since expired in 1988). ANCA required a similar phase out of Stage 2 aircraft over 75,000 pounds by December 31, 1999. The 75,000-pound weight limit exempted most "business" (or "corporate") jets and a very small number of the very smallest "air carrier" type jets until December 31, 2015 when a full ban took effect.[11] Aircraft operators responded to the Stage 1 and 2 phase-outs by retiring their non-compliant aircraft or modifying some of their aircraft to meet the more stringent standards. The modifications undertaken include installation of quieter engines, noise-reducing physical modifications to the airframe and/or existing engines, and limitation of operating weights and procedures to meet the applicable Part 36 limits. Some former Stage 2 airline aircraft that were "recertificated" as Stage 3 with these modifications still operate at Logan Airport, but are generally declining due to the aircrafts' age and high operating costs (in particular due to the generally low fuel efficiency of these older aircraft).

From 2006 to 2017, as airlines add new aircraft, Stage 4 aircraft have been added to their fleets. The Stage 4 noise standard applies to any new jet aircraft type designs over 12,500 pounds requiring FAA approval after January 1, 2006. The International Civil Aviation Organization (ICAO) has also adopted the same regulation for international operators, but neither FAA nor ICAO have indicated there will be restrictions on the remaining recertificated Stage 3 aircraft from carrier fleets.

ICAO and FAA adopted a higher standard of noise classification called Stage 5 (Chapter 14 for ICAO) which was effective for new aircraft type certification after December 31, 2017 and December 31, 2020, depending on the weight of the aircraft.[12]

Part 161

FAA implemented the ANCA requirements related to notice, analysis, and approval of use restrictions affecting Stage 2 and 3 aircraft through the establishment of a new regulation, 14 CFR Part 161, "Notice and Approval of Airport Noise and Access Restrictions." In simple terms, Part 161 requires an airport operator that proposes to implement a restriction on Stage 2 or 3 aircraft operations to undertake, document, and publicize certain benefit-cost analyses, comparing the noise benefits of the restriction to its economic costs. Operators must obtain specific FAA approvals of the analysis, documentation, and notice processes, and – for Stage 3 restrictions – approval of the restriction itself.

Part 161 and ANCA define more demanding requirements and explicit guidance for Stage 3 restrictions. To implement a Stage 3 restriction, formal FAA approval is required. FAA's role for Stage 2 restrictions is limited to commenting on compliance with Part 161 notice and analysis procedural requirements. Part 161 provides guidance regarding appropriate information to provide in support of these findings. While Part 161 does not require this information for a Stage 2 restriction, Part 161 states that it would be "useful." Moreover, FAA has required airports to provide this same information for Stage 2 restrictions (and even for Stage 1 restrictions pursued under FAR Part 150), on the grounds that they are required for airports to comply with grant assurance 22(a), "Economic Nondiscrimination," which states that an airport operator "will make its airport available as an airport for public use on reasonable terms and without

11 FAA Modernization and Reform Act of 2012 sets a January 1, 2016 ban of Stage 2 aircraft less than 75,000 lbs.

12 The Final Rule was published on October 4, 2017.

unjust discrimination to all types, kinds, and classes of aeronautical activities, including commercial aeronautical activities offering services to the public at the Airport."[13]

Although several (on the order of a dozen) airports have embarked on efforts to adopt both Stage 2 and 3 restrictions in the past two decades, FAA has found that only one, Naples Municipal Airport, a general aviation (GA) airport in Naples, Florida, has fully complied with Part 161 analysis, notice, and documentation requirements for a ban on Stage 2 jet operations. FAA found the airport was in violation of prior to FAA grant assurances. The airport operator successfully sued FAA to overturn that ruling and has implemented the restriction.

ANCA and Part 161 specifically exempt Stage 3 use restrictions that were effective on or before October 1, 1990 and Stage 2 restrictions that were proposed before that date. The Logan Airport Noise Rules were promulgated in 1986; therefore, ANCA and Part 161 have no bearing on their continued implementation in their current form. Any future proposals to make the rules more stringent regarding Stage 2 operations or to restrict Stage 3 operations in any way would almost certainly trigger Part 161 notice, analysis, and approval processes for Stage 3 restrictions. In 2006, Massport requested an opinion from FAA regarding the pursuit of a Part 161 waiver or exemption to allow Massport to implement a curfew of nighttime operations of hush-kitted Stage 3 aircraft. FAA informed Massport that a waiver or exemption from the requirements of Part 161 is not authorized under, or consistent with, federal statutory and regulatory requirements. A copy of FAA's letter to Massport was provided in Appendix H, *Noise Abatement* in the *2005 EDR*.

Logan Airport Noise Modeling

To relate portions of the foregoing discussion to the specific noise environment around Logan Airport for this *2018/2019 EDR*, Massport has developed DNL noise contours, TA noise metrics, and population counts for 2018 and 2019 using the latest version of the FAA's AEDT, version 3c, and a proprietary AEDT pre-processor. The pre-processor software takes radar data from individual flights occurring throughout the year, and structures it into a form usable as input to the AEDT. The AEDT serves as the computational "engine" for calculating noise. Prior to 2016, Massport used the FAA's INM with a pre-processor called RealContours™ which operated in a similar manner.

Standard AEDT input methodology involves development of operational inputs and calculation of the DNL for a prototypical average annual day.[14] This approach requires manually collecting, refining, and entering the enormous amount of data averaged over a full year of activity at an airport. Typically, the model inputs may include an aircraft fleet mix with several dozen representative aircraft types, on the order of 100 to 300 representative flight tracks (common for a facility the size of Logan Airport), and runway use and flight track use percentages for three or four categories of aircraft types with similar

13 FAA Order 5190.6(b), "Airport Compliance Manual" Chapter 13, Section 14, paragraph (a). To be approved, restrictions must meet the following six statutory criteria: 1) The proposed restriction is reasonable, nonarbitrary, and nondiscriminatory. 2) The proposed restriction does not create an undue burden on interstate or foreign commerce. 3) The proposed restriction maintains safe and efficient use of the navigable airspace. 4) The proposed restriction does not conflict with any existing federal statute or regulation. 5) The applicant has provided adequate opportunity for public comment on the proposed restriction. 6) The proposed restriction does not create an undue burden on the national aviation system.

14 Guidance on Using the Aviation Environmental Design Tool (AEDT) to Conduct Environmental Modeling for FAA Actions Subject to NEPA, October 27, 2017, Section 3.2, p. 13

performance characteristics. This normal approach to noise modeling meets accepted professional standards and reduces the effort and cost that would be associated with manually entering the parameters for every actual operation. However, it represents a significant simplification of the extraordinary diversity of actual aircraft operations over a year.

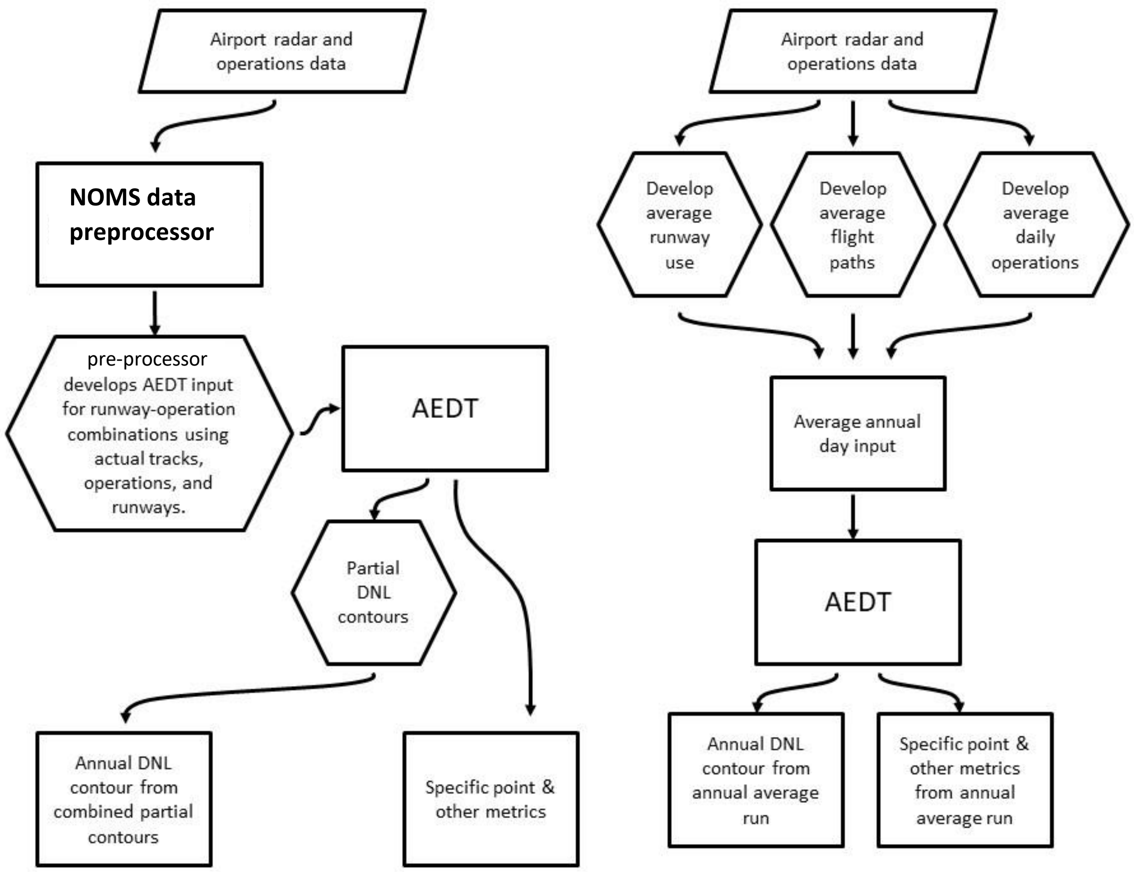
Instead of relying on consolidated data summaries, Massport takes maximum possible advantage of both AEDT's capabilities and the investment that Massport has made in its Noise and Operations Management System (NOMS). The AEDT pre-processor improves the precision of modeling by utilizing operations monitoring results in these key areas:

- Directly converts the flight track for every identified aircraft operation to an AEDT track, rather than assigning multiple operations to a limited number of prototypical tracks.
- Models each operation on the specific runway that it actually used, rather than applying a generalized distribution to broad ranges of aircraft types.
- Models each operation in the time period that it occurred, which realistically represent delays that occur during the year, rather than relying on scheduled flight times.
- Selects the specific airframe and engine combination to model, on an operation-by-operation basis, based on the registration data for each flight wherever possible; otherwise, based on the published compositions of the fleets of the specific airlines operating at Logan Airport.

Figure H-12 provides a schematic representation of Massport's annual noise modeling process compared to the standard AEDT process. The flow chart on the left depicts data from the NOMS system being used as noise model inputs, while the flow chart on the right illustrates the development of a simplified average annual day that would be otherwise necessary.

For 2018, the AEDT noise model used 417,022 flights from the NOMS that retained suitable data. For 2019, the number of usable flights was 410,663.

Figure H-12 Schematic Noise Modeling Process (using NOMS data pre-processor vs. standard AEDT use)



Source: Federal Aviation Administration (FAA), HMMH.

AEDT Noise Analysis

Logan Airport presents a set of unique challenges to modeling software, and over the course of many years, Massport has addressed these challenges by developing a series of adjustments and customizations to better represent the operations, conditions, and terrain that affect noise at Logan Airport. These adjustments have historically been incorporated into INM analyses:

- ***Custom profiles***. The analysis has developed custom climbing and descent profiles based on radar altitude data, rather than using default profiles built into INM. This results in more accurate aircraft thrust calculations, which in turn affects an aircraft's noise emissions.
- ***Daily weather data***. Noise calculations have used average weather conditions for each day to determine aircraft performance and sound propagation.

- ***Hill effect adjustment***. Due to discrepancies between noise monitor data and INM calculations in the Orient Heights area close to the Airport, adjustments have been included to improve the accuracy of calculations in areas with direct line-of-sight exposure to the airfield.
- ***Over-water adjustment***. The INM calculations assume that noise is absorbed as it propagates over ground. However, Logan Airport is mostly surrounded by water, which reflects rather than absorbs the sound. This results in higher noise levels in areas near the Airport. An adjustment has been used that allows the INM to assume higher aircraft noise emissions when they are close to the ground.

In 2015, FAA released its next-generation environmental analysis software, the AEDT version 2B.[15] AEDT incorporates the computational engines of the legacy tools INM and the Emissions and Dispersion Modeling System (EDMS) and provides a unified database back end and graphical user interface. With a common set of aircraft and airport data that are updated regularly, AEDT ensures that noise and emissions analyses can be performed with up-to-date information.

Massport first explored the use of AEDT for the *2015 EDR* and adopted AEDT as its ongoing noise model beginning with the *2016 EDR*. In transitioning from INM to AEDT, Massport has investigated how to implement the historical adjustments in the new software. While the Massachusetts state EDR/Environmental Status and Planning Report (ESPR) process does not require FAA approval, Massport wishes to perform analysis to FAA standards. Massport has held numerous meetings with FAA since the release of AEDT to get approval for adjustments to AEDT. The following is a summary of the proposed measures to address the adjustments previously implemented in INM, and FAA's response.

- ***Altitude control codes***. This feature of AEDT performs a similar function to the custom profiles used previously, using altitude data to more accurately calculate aircraft thrust levels. Since this is a capability built into AEDT, **FAA approval is implicit** and was not requested.
- ***Aircraft weight adjustment***. It has been determined that aircraft takeoff weights, based on Department of Transportation T-100 data, do not always match the weight assumptions made by AEDT. Consequently, an adjustment has been made to more accurately represent takeoff weight, and therefore aircraft thrust during takeoff. Massport utilized the new alternative weight departure profiles added in AEDT 3b and available in AEDT 3c if they were available for an aircraft in the AEDT. **FAA concurs with this approach**.
- ***Annual weather***. AEDT by default uses 30-year average weather for the Airport. Massport has proposed using an annual average for the year under study to better capture year-to-year variations in weather.[16] **FAA concurs with this approach**.
- ***Hill effects***. Massport has proposed including the adjustments previously used in INM. **FAA does not concur with this approach**. There are ongoing research studies to develop modifications to the AEDT model and FAA recommends waiting until those methods are available.
- ***Over water adjustment***. Massport explored other options including the existing INM adjustment method. Massport proposed including the adjustments previously used in INM. **FAA does not concur with this approach**. There are ongoing research studies to develop modifications to the AEDT model and FAA recommends waiting until those methods are available.

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15 AEDT 2A was released in 2013 and replaced the NIRS model for airspace analysis. AEDT 2B replaces, AEDT 2A, INM and EDMS.

16 Daily weather is currently not an option in AEDT modeling inputs, however Massport will continue to request that FAA allow for such an option.

Massport will continue to work with FAA to address these issues and to incorporate enhancements to AEDT as they become available. In March 2017, the Airport Cooperative Research Program (ACRP) published an FAA-sponsored study entitled "Improving AEDT Noise Modeling of Ground Surfaces." The study recommends a methodology and provides guidance for implementation in AEDT, however at the time of this study, FAA has not recommended the method for use with AEDT or incorporated the ACRP study information into the AEDT.

In March 2018, ACRP published "Enhanced AEDT Modeling of Aircraft Arrival and Departure Profiles Volume 1: Guidance."[17] It highlights new data with alternate default profiles for specific aircraft and new methodology available to model users to customize flight profiles in greater detail than was previously available. The study recommends a methodology and provides guidance for implementation in AEDT, however at the time of this study, FAA has not recommended the method for use with AEDT or incorporated the ACRP study information into the AEDT.

At this time, FAA has concurred with adjustments for annual average weather and the adjustment of aircraft stage length, but disapproved adjustments for over-water effects and elevated terrain line-of-sight exposure. Massport has performed the AEDT analyses for 2018 and 2019 using only FAA-approved adjustments.

FAA's AEDT version 2c Service Pack 2 (AEDT 2c SP2) was released for general use on March 13, 2017; it was the version used to generate the 2016 DNL contours and accompanying noise analyses. AEDT version 2d was released on September 27, 2017. FAA guidance states that an airport noise modeling project should use the most current model version available at the time the project begins. Massport used AEDT 2d for the 2017 DNL contours and accompanying noise analyses. AEDT version 3b was released on September 24, 2019. AEDT version 3c was originally released on March 6, 2020 and re-released on June 19, 2020. Massport used the re-released AEDT version 3c for all of the 2018 and 2019 noise modeling contained in this EDR.

The updates to AEDT 2d primarily focused on aircraft performance modeling and emissions calculations. Six new aircraft types were added to the AEDT database since version 2d; four of these (the A350-941, the G650ER, the A320-271N, and the FAL900EX) are included in the 2018 and 2019 noise modeling. Data for three other aircraft types (737MAX8, 737800, and 767300) were updated. In May 2020, the FAA released data for a 767-300ER aircraft which could be incorporated into AEDT 3c. This is a new aircraft type in addition to the 767-300 already in the model. Massport evaluated the 2018 and 2019 data and determined that over 60 percent of the 767-300 fleet would use this type if available in the AEDT. Therefore, Massport included this type in the 2018 and 2019 AEDT modeling as the U_7673ER type.

The most significant changes in the model from AEDT 2d to AEDT 3c are reduced thrust/alternative weight aircraft performance profiles. Further updates to the aircraft noise and performance (ANP) model from versions 3b to 3c include a physics-based thrust calculation for approach, a new fuel burn calculation method, and aircraft acceleration parameters at altitudes higher than 10,000 feet.

17 Airport Cooperative Research Program Web-Only Document 36: Enhanced AEDT Modeling of Aircraft Arrival and Departure Profiles, Volume 1: Guidance. http://www.trb.org/Main/Blurbs/178074.aspx.

The differences between AEDT 3c and AEDT 2d with regard to DNL contour results are minimal. The following sections of this appendix provide several tables describing the AEDT input data for 2018 and 2019. Where possible, the data for 2017 are included for comparison.

2018/2019 Radar Data

Logan Airport's radar data provide the key to the AEDT pre-processor system. The Passive Surveillance Radar System (PASSUR) radar dataset was used for the *2004 ESPR* through the *2008 EDR*. For the *2009 EDR* through the *2014 EDR*, Massport used the radar data from its Harris NOMS system. These radar data are obtained from a multilateration system of eight sensors deployed around the Airport. The positioning data from these sensors are correlated to provide better, more accurate coverage of aircraft (in areas where the traditional FAA radar has limitations) and provide a more complete set of points to define each track. Traditional radar provides points every four to five seconds where the multilateration system provides data every second.

In 2015, the Massport system switched to FAA's NextGen data feed, which integrates the Automatic Dependent Surveillance Broadcast (ADS-B) feed with multiple redundant real-time FAA surveillance sources into a single fused data feed. The NextGen data is a "multisensor based" subscription data source that aggregates all available surveillance sources, including:

- FAA En Route Radars;
- FAA Terminal Radars;
- FAA Airport Surface Detection Equipment X Band (ASDE-X) Systems;
- FAA Aircraft Situational Display to Industry (ASDI) Oceanic and Canadian Tracks only; and
- Harris ADS-B Data Feed.

Logan Airport is supported by an FAA ASDE-X system which provides highly accurate one-second data points for aircraft situational awareness on the Airport and within at least 5 miles of the Airport. These data are fused with the other sources and provided to the Massport NOMS system in a geo-referenced data format. The geo-referenced radar data are imported into the AEDT model, which is built on a geo-referenced platform to retain accuracy of the data for modeling.

The system was able to collect 365 complete days of data for both 2018 and 2019 with approximately 98 and 97 percent (respectively) of these tracks (417,022 out of the total 424,865 in 2018 and 410,663 out of the total 424,268 in 2019) usable for the development of the noise exposure contours.

Fleet Mix

The 2018 and 2019 radar data were first processed to establish a baseline set of operations. After processing, the operations from these tracks were then scaled upwards by airline and aircraft type to match the reported totals provided by Massport for the respective year. **Tables H-1a** (2019), **H-1b** (2018), and **H-1c** (2017 for comparison) provide the scaled annual operations, by Aircraft Noise and Performance (ANP) aircraft type. Each ANP type listed in **Tables H-1a, H1-b,** and **H-1c** is also mapped to a Runway Use group based on its weight and performance characteristics described in the Runway Use section below.

Regional jets (RJ) are defined as those aircraft with 90 or fewer seats, consistent with the categorization in Chapter 2, *Activity Levels*.[18] For years prior to 2010, the RJs in this report were classified as aircraft with less than 100 seats. When RJs first started gaining popularity, the aircraft types available were typically 50 seats or less with the traditional air carrier jet being 100 seats and higher. As newer aircraft types have become available, the smaller 35 to 50 seat types have been replaced by 70 to 99-seat types, with the 90 and above seat types flying many of the traditional air carrier routes. The majority of the newer types fall into two categories: the 70- to 75-seat category, which remain categorized as RJs, and the 91- to 99-seat category, which are categorized as air carrier jets. The Embraer 190 falls into this category and is now in the Light Jet B group.

18 U.S. Code, 2006 Edition, Supplement 3, Title 49 – Transportation Subtitle VII – Aviation Programs Part A – Air Commerce and Safety, Subpart II, Economic Regulation, Chapter 417 - Operations or Carriers, Subchapter III - Regional Air Service Incentive Program, Sec. 41762 – Definitions – defines RJ air carrier service to be aircraft with a maximum of 75 seats. Therefore, this report categorizes aircraft with 70-75 seats and below as RJ and aircraft with 90 seats and higher aircraft as air carrier (Note: there are no types with 75 to 90 seats).

Table H-1a 2019 Annual Modeled Operations

		Arrivals		Departures		
ANP Type	**Group**	**Day**	**Night**	**Day**	**Night**	**Total**
Commercial Jet Operations						
7478	Heavy Jet A	210	0	209	1	419
747400	Heavy Jet A	277	3	274	6	559
A340-211	Heavy Jet A	358	4	146	216	725
A340-642	Heavy Jet A	308	4	295	16	623
A380-841	Heavy Jet A	201	0	201	0	402
A380-861	Heavy Jet A	160	0	3	157	320
767300	Heavy Jet B	14	1	11	4	30
767400	Heavy Jet B	50	1	49	2	102
777200	Heavy Jet B	1,058	295	1,003	350	2,707
777300	Heavy Jet B	1	0	1	0	2
767CF6	Heavy Jet B	87	40	6	121	254
767JT9	Heavy Jet B	120	17	3	134	273
7773ER	Heavy Jet B	848	127	40	935	1,949
7878R	Heavy Jet B	1,867	42	1,396	514	3,819
A300-622R	Heavy Jet B	410	665	615	460	2,151
A330-301	Heavy Jet B	2,082	4	1,709	377	4,172
A330-343	Heavy Jet B	1,576	445	1,224	797	4,043
A350-941	Heavy Jet B	250	1	242	9	502
DC1010	Heavy Jet B	30	10	24	16	81
DC1030	Heavy Jet B	18	13	14	17	63
MD11GE	Heavy Jet B	38	6	44	1	89
MD11PW	Heavy Jet B	13	3	15	1	32
U_7673ER	Heavy Jet B	2,455	841	2,147	1,148	6,590
717200	Light Jet A	1,656	390	1,482	564	4,093
737800	Light Jet A	15,886	6,442	18,296	4,033	44,658
MD9025	Light Jet A	3	0	3	0	6
MD9028	Light Jet A	1	1	1	1	4
737300	Light Jet B	1	0	1	0	2
737400	Light Jet B	24	12	24	12	71
737700	Light Jet B	5,763	1,973	6,263	1,474	15,473
757300	Light Jet B	289	20	278	31	618
737MAX8	Light Jet B	192	191	228	154	765
737N17	Light Jet B	1	0	0	1	2
757PW	Light Jet B	2,842	1,098	3,113	826	7,879
757RR	Light Jet B	1,767	598	2,128	237	4,730
A319-131	Light Jet B	6,840	1,220	6,820	1,241	16,121
A320-211	Light Jet B	3,642	1,047	4,252	437	9,380
A320-232	Light Jet B	17,864	6,681	20,414	4,131	49,090
A320-271N	Light Jet B	507	206	508	204	1,425

Table H-1a 2019 Annual Modeled Operations (Continued)

		Arrivals		Departures		
ANP Type	**Group**	**Day**	**Night**	**Day**	**Night**	**Total**
Commercial Jet Operations, continued						
A321-232	Light Jet B	17,276	6,158	19,398	4,036	46,868
EMB190	Light Jet B	29,533	6,367	29,873	6,027	71,800
MD83	Light Jet B	5	0	4	1	10
CL600	RJ	783	19	745	58	1,605
CNA750	RJ	1	0	1	0	2
CRJ9-ER	RJ	5,246	560	5,159	646	11,610
CRJ9-LR	RJ	733	30	625	138	1,526
EMB145	RJ	18	0	17	1	36
EMB14L	RJ	1,655	119	1,763	11	3,549
EMB170	RJ	5,264	375	5,204	436	11,279
EMB175	RJ	8,863	1,033	8,972	924	19,792
FAL20	RJ	1	1	2	0	3
G650ER	RJ	1	0	1	0	2
GV	RJ	2	0	2	0	3
LEAR35	RJ	7	5	8	3	24
	Commercial Jets Subtotal	**139,096**	**37,071**	**145,257**	**30,910**	**352,334**
Commercial Non-Jet Operations						
BEC58P	Non-jet	17,514	165	17,608	71	35,358
CNA208	Non-jet	1,126	12	1,118	20	2,276
DHC6	Non-jet	5	12	16	0	33
DHC830	Non-jet	3,764	152	3,727	189	7,833
GASEPV	Non-jet	2	0	2	0	4
SF340	Non-jet	208	0	208	0	416
	Commercial Non-Jet Operations Subtotal	**22,619**	**341**	**22,681**	**279**	**45,920**
	Commercial Aircraft Total	**161,715**	**37,412**	**167,938**	**31,189**	**398,254**
General Aviation Operations						
A109	Helicopter	7	0	7	0	14
B206L	Helicopter	11	0	11	0	21
B407	Helicopter	22	2	20	4	48
B427	Helicopter	1	0	1	0	2
B429	Helicopter	8	14	11	11	43
B430	Helicopter	3	1	4	0	8
EC130	Helicopter	34	2	30	6	72
H500D	Helicopter	2	0	2	0	4
R44	Helicopter	20	1	19	2	43
S76	Helicopter	148	28	135	41	351

Table H-1a 2019 Annual Modeled Operations (Continued)

		Arrivals		Departures		
ANP Type	**Group**	**Day**	**Night**	**Day**	**Night**	**Total**
General Aviation Operations, continued						
SA330J	Helicopter	193	24	191	26	434
SA350D	Helicopter	3	0	2	1	6
SA355F	Helicopter	31	1	32	0	64
SA365N	Helicopter	5	1	5	1	12
747400	Heavy Jet A	1	0	1	0	2
747SP	Heavy Jet A	1	0	1	0	2
A340-211	Heavy Jet A	1	0	0	1	2
A340-642	Heavy Jet A	2	0	2	0	4
777300	Heavy Jet B	2	1	3	0	6
7773ER	Heavy Jet B	0	1	0	1	2
7878R	Heavy Jet B	1	0	1	0	2
A330-301	Heavy Jet B	1	0	1	0	2
A330-343	Heavy Jet B	1	0	1	0	2
C17	Heavy Jet B	1	0	1	0	2
U_7673ER	Heavy Jet B	1	0	1	0	2
737800	Light Jet A	0	1	1	0	2
727EM1	Light Jet A	1	0	0	1	2
737400	Light Jet B	23	4	18	9	54
737700	Light Jet B	5	0	5	0	10
757PW	Light Jet B	0	1	0	1	2
757RR	Light Jet B	1	0	1	0	2
A319-131	Light Jet B	4	0	3	1	8
A321-232	Light Jet B	0	1	1	0	2
EMB190	Light Jet B	1	0	1	0	2
MD81	Light Jet B	1	0	1	0	2
BD-700-1A10	RJ	325	36	319	41	720
BD-700-1A11	RJ	140	17	143	14	314
CIT3	RJ	25	0	25	0	50
CL600	RJ	1,506	139	1,535	110	3,290
CL601	RJ	278	25	279	23	604
CNA500	RJ	46	3	43	6	97
CNA510	RJ	195	9	191	13	407
CNA525C	RJ	388	60	383	65	897
CNA55B	RJ	904	79	920	63	1,966
CNA560E	RJ	2	1	3	0	6
CNA560U	RJ	679	50	687	42	1,458
CNA560XL	RJ	334	14	334	14	695
CNA680	RJ	1,104	72	1,126	51	2,353
CNA750	RJ	873	70	889	54	1,886
CRJ9-ER	RJ	0	1	1	0	2

Table H-1a 2019 Annual Modeled Operations (Continued)

		Arrivals		Departures		
ANP Type	**Group**	**Day**	**Night**	**Day**	**Night**	**Total**
General Aviation Operations, continued						
ECLIPSE500	RJ	11	1	11	1	23
EMB145	RJ	29	3	29	3	64
FAL20	RJ	4	0	3	1	8
FAL900EX	RJ	283	21	278	26	608
G650ER	RJ	174	28	190	12	405
GIIB	RJ	6	1	7	0	14
GIV	RJ	564	77	568	73	1,282
GV	RJ	398	42	400	40	879
IA1125	RJ	180	21	185	15	401
LEAR25	RJ	1	0	1	0	2
LEAR35	RJ	837	135	861	110	1,942
MU3001	RJ	314	22	311	25	672
1900D	Non-jet	1	0	1	0	2
BEC58P	Non-jet	426	26	426	26	904
C130	Non-jet	4	0	4	0	8
CNA172	Non-jet	24	2	26	0	52
CNA182	Non-jet	75	0	75	0	149
CNA206	Non-jet	5	0	5	0	10
CNA208	Non-jet	1,137	99	1,138	99	2,473
CNA441	Non-jet	17	3	16	4	41
COMSEP	Non-jet	317	34	335	17	703
DHC6	Non-jet	780	81	749	112	1,722
DHC8	Non-jet	2	0	2	0	4
EMB120	Non-jet	0	1	0	1	2
GASEPF	Non-jet	15	0	15	0	29
GASEPV	Non-jet	204	12	209	8	434
HS748A	Non-jet	2	0	2	0	4
PA28	Non-jet	23	2	25	0	50
PA30	Non-jet	1	0	1	0	2
PA31	Non-jet	26	0	25	1	52
PA42	Non-jet	2	1	2	1	6
	General Aviation Total	**13,191**	**1,270**	**13,286**	**1,175**	**28,922**
	Grand Total	**174,907**	**38,681**	**181,224**	**32,364**	**427,176**

Source: HMMH, 2020.
Notes: ANP - Aircraft Noise and Performance.
BEC58P is the AEDT substitution for the Cessna 402.
The CRJ9-ER in the RJ category is the CRJ700 aircraft.
Annual operations modeled in the 2019 annual contour.
Some totals may not match due to rounding.

Table H-1b 2018 Annual Modeled Operations

		Arrivals		Departures		
ANP Type	Group	Day	Night	Day	Night	Total
Commercial Jet Operations						
74720B	Heavy Jet A	0	1	0	1	2
747400	Heavy Jet A	280	28	272	36	616
7478	Heavy Jet A	285	0	285	0	569
A340-211	Heavy Jet A	304	2	139	167	612
A340-642	Heavy Jet A	245	0	127	118	490
A380-841	Heavy Jet A	88	1	88	1	178
A380-861	Heavy Jet A	2	0	0	2	4
767300	Heavy Jet B	27	0	23	4	54
767400	Heavy Jet B	10	3	8	5	26
767CF6	Heavy Jet B	96	30	3	123	252
767JT9	Heavy Jet B	108	30	8	130	275
777200	Heavy Jet B	932	194	852	274	2,251
7773ER	Heavy Jet B	870	116	123	863	1,972
7878R	Heavy Jet B	1,684	9	1,393	300	3,386
A300-622R	Heavy Jet B	455	540	642	352	1,990
A310-304	Heavy Jet B	30	1	17	14	62
A330-301	Heavy Jet B	2,033	10	1,725	319	4,087
A330-343	Heavy Jet B	985	8	432	561	1,986
A350-941	Heavy Jet B	630	3	399	235	1,267
DC1010	Heavy Jet B	46	22	50	18	136
DC1030	Heavy Jet B	7	5	7	5	24
MD11GE	Heavy Jet B	62	11	54	19	146
MD11PW	Heavy Jet B	30	3	23	10	66
U_7673ER	Heavy Jet B	2,222	822	2,146	898	6,089
717200	Light Jet A	1,861	325	1,621	564	4,371
DC93LW	Light Jet A	0	1	0	1	2
MD9025	Light Jet A	185	6	150	41	382
MD9028	Light Jet A	63	1	54	10	128
737300	Light Jet B	1	0	1	0	2
737400	Light Jet B	47	14	36	24	121
737700	Light Jet B	6,606	2,250	7,035	1,820	17,711
737800	Light Jet B	20,542	7,363	23,471	4,434	55,809
737MAX8	Light Jet B	573	174	621	127	1,496
757300	Light Jet B	67	30	74	23	194
757PW	Light Jet B	2,551	830	2,721	659	6,760
757RR	Light Jet B	771	680	1,285	166	2,902
A319-131	Light Jet B	7,811	1,172	7,739	1,244	17,965
A320-211	Light Jet B	4,106	1,369	5,082	393	10,950
A320-232	Light Jet B	17,720	6,780	20,222	4,277	48,999

Table H-1b 2018 Annual Modeled Operations (Continued)

		Arrivals		Departures		
ANP Type	**Group**	**Day**	**Night**	**Day**	**Night**	**Total**
Commercial Jet Operations, continued						
A320-271N	Light Jet B	170	36	172	34	411
A321-232	Light Jet B	14,198	5,489	16,099	3,588	39,374
EMB190	Light Jet B	28,021	4,677	27,711	4,987	65,396
MD83	Light Jet B	133	5	134	4	276
BD-700-1A10	RJ	1	0	0	1	2
CL600	RJ	2,209	28	2,103	134	4,474
CNA750	RJ	1	0	1	0	2
CRJ9-ER	RJ	7,314	994	7,139	1,169	16,616
CRJ9-LR	RJ	63	10	56	17	146
EMB145	RJ	183	7	183	7	379
EMB14L	RJ	2,865	196	2,772	289	6,123
EMB170	RJ	2,197	103	2,183	117	4,601
EMB175	RJ	5,965	935	6,151	749	13,800
FAL20	RJ	1	0	1	0	2
LEAR35	RJ	6	4	5	5	21
	Commercial Jets Subtotal	**137,658**	**35,319**	**143,636**	**29,341**	**345,954**
Commercial Non-Jet Operations						
BEC58P	Non-jet	17,433	329	17,659	103	35,523
CNA208	Non-jet	802	6	795	13	1,617
DHC6	Non-jet	2	15	17	0	34
DHC8	Non-jet	5	0	5	0	10
DHC830	Non-jet	4,067	160	3,994	234	8,456
SF340	Non-jet	745	0	745	0	1,490
	Commercial Non-Jet Operations Subtotal	**23,054**	**511**	**23,215**	**350**	**47,130**
	Commercial Aircraft Total	**160,712**	**35,830**	**166,851**	**29,691**	**393,084**
General Aviation Operations						
A109	Helicopter	10	0	7	3	20
B206L	Helicopter	8	1	7	2	18
B407	Helicopter	27	0	25	2	55
B427	Helicopter	1	0	1	0	2
B429	Helicopter	23	0	18	5	45
B430	Helicopter	2	0	2	0	4
EC130	Helicopter	24	5	24	6	59
R44	Helicopter	14	0	14	0	27
S76	Helicopter	199	26	183	41	449
SA330J	Helicopter	191	8	175	24	398

Table H-1b	2018 Annual Modeled Operations (Continued)					
		Arrivals		Departures		
ANP Type	Group	Day	Night	Day	Night	Total
General Aviation Operations, continued						
SA350D	Helicopter	17	0	15	2	33
SA355F	Helicopter	28	1	28	1	59
SA365N	Helicopter	4	0	3	1	8
747400	Heavy Jet A	1	0	1	0	2
767300	Heavy Jet B	2	0	0	2	4
C17	Heavy Jet B	1	0	1	0	2
727EM1	Light Jet A	1	0	1	0	2
727EM2	Light Jet A	1	0	1	0	2
737700	Light Jet B	2	0	2	0	4
MD81	Light Jet B	3	2	0	5	10
BD-700-1A10	RJ	307	35	317	25	684
BD-700-1A11	RJ	192	15	189	18	414
CIT3	RJ	22	2	22	2	47
CL600	RJ	1,461	132	1,484	108	3,185
CL601	RJ	302	45	311	36	694
CNA500	RJ	35	4	38	1	78
CNA510	RJ	133	8	133	8	282
CNA525C	RJ	470	62	470	62	1,064
CNA55B	RJ	813	61	830	44	1,748
CNA560E	RJ	34	4	36	2	76
CNA560U	RJ	822	64	829	57	1,772
CNA560XL	RJ	356	24	355	25	758
CNA680	RJ	897	57	891	64	1,909
CNA750	RJ	1,024	97	1,043	78	2,242
ECLIPSE500	RJ	11	1	12	0	24
EMB145	RJ	59	5	55	9	127
FAL20	RJ	3	0	3	0	6
FAL900EX	RJ	303	32	307	29	670
G650ER	RJ	207	33	220	21	480
GIIB	RJ	6	2	7	1	16
GIV	RJ	611	79	606	84	1,380
GV	RJ	435	34	422	46	937
IA1125	RJ	155	12	159	9	335
LEAR25	RJ	1	0	0	1	2
LEAR35	RJ	1,026	131	1,039	118	2,315
MU3001	RJ	442	28	436	34	941
1900D	Non-jet	2	1	3	0	6
BEC58P	Non-jet	509	22	507	24	1,062
CNA172	Non-jet	18	1	19	0	37
CNA182	Non-jet	115	0	115	0	229

Table H-1b 2018 Annual Modeled Operations (Continued)

		Arrivals		Departures		
ANP Type	**Group**	**Day**	**Night**	**Day**	**Night**	**Group**
General Aviation Operations, continued						
CNA206	Non-jet	22	0	22	0	43
CNA208	Non-jet	1,228	146	1,270	103	2,748
CNA441	Non-jet	25	3	23	6	57
COMSEP	Non-jet	331	33	344	20	729
DHC6	Non-jet	876	91	864	103	1,934
DO328	Non-jet	2	0	2	0	4
GASEPF	Non-jet	9	0	9	0	18
GASEPV	Non-jet	280	7	280	7	574
PA28	Non-jet	28	0	28	0	57
PA30	Non-jet	1	0	1	0	2
PA31	Non-jet	26	0	25	1	53
	General Aviation Total	**14,156**	**1,314**	**14,234**	**1,236**	**30,940**
	Grand Total	**174,868**	**37,143**	**181,085**	**30,927**	**424,024**

Source: HMMH, 2020.
Notes: ANP - Aircraft Noise and Performance.
BEC58P is the AEDT substitution for the Cessna 402.
The CRJ9-ER in the RJ category is the CRJ700 aircraft.
Annual operations modeled in the 2018 annual contour.
Some totals may not match due to rounding.

Table H-1c 2017 Annual Modeled Operations

		Arrivals		Departures		
ANP Type	**Group**	**Day**	**Night**	**Day**	**Night**	**Total**
Commercial Jet Operations						
74720B	Heavy Jet A	2	2	2	1	6
747400	Heavy Jet A	428	18	375	71	891
7478	Heavy Jet A	343	0	341	2	686
A340-211	Heavy Jet A	189	4	107	87	387
A340-642	Heavy Jet A	97	1	81	17	197
A380-861	Heavy Jet A	90	0	88	2	179
767300	Heavy Jet B	1,619	627	1,496	750	4,493
767400	Heavy Jet B	14	3	12	5	34
767CF6	Heavy Jet B	29	11	8	32	80
767JT9	Heavy Jet B	52	13	2	63	130
777200	Heavy Jet B	1,024	182	1,105	101	2,412
777300	Heavy Jet B	16	1	8	9	34
7773ER	Heavy Jet B	841	160	228	773	2,002
7878R	Heavy Jet B	1,614	27	1,345	296	3,282
A300-622R	Heavy Jet B	374	639	572	441	2,025
A310-304	Heavy Jet B	436	47	244	239	966
A330-301	Heavy Jet B	2,463	12	2,094	381	4,949
A330-343	Heavy Jet B	1,565	13	751	827	3,157
DC1010	Heavy Jet B	168	97	199	66	531
DC1030	Heavy Jet B	16	7	15	8	46
MD11GE	Heavy Jet B	52	14	45	21	132
MD11PW	Heavy Jet B	23	4	21	6	54
717200	Light Jet A	2,282	468	2,151	598	5,499
MD9025	Light Jet A	476	25	490	11	1,002
MD9028	Light Jet A	238	12	246	4	501
737300	Light Jet B	1,193	432	1,349	275	3,250
737400	Light Jet B	14	9	9	15	47
737500	Light Jet B	0	2	0	2	4
737700	Light Jet B	6,696	2,064	7,339	1,421	17,520
737800	Light Jet B	18,826	6,821	20,999	4,649	51,295
7378MAX	Light Jet B	16	0	15	1	32
757300	Light Jet B	716	313	772	257	2,059
757PW	Light Jet B	1,303	505	1,258	547	3,612
757RR	Light Jet B	2,165	491	2,396	263	5,316
A319-131	Light Jet B	8,914	1,633	9,053	1,494	21,094
A320-211	Light Jet B	3,691	1,144	4,452	383	9,670
A320-232	Light Jet B	17,318	6,766	20,347	3,737	48,169
A321-232	Light Jet B	8,619	3,132	10,286	1,465	23,502
EMB190	Light Jet B	28,627	4,399	28,269	4,757	66,053
MD83	Light Jet B	503	72	534	42	1,151

Table H-1c 2017 Annual Modeled Operations (Continued)

		Arrivals		Departures		
ANP Type	**Group**	**Day**	**Night**	**Day**	**Night**	**Total**
Commercial Jet Operations, continued						
CL600	RJ	4,614	125	4,442	296	9,477
CRJ9-ER	RJ	6,024	548	5,842	730	13,144
EMB145	RJ	314	28	303	39	684
EMB14L	RJ	1,060	28	1,012	76	2,176
EMB170	RJ	1,588	167	1,615	140	3,509
EMB175	RJ	4,533	708	4,575	667	10,483
LEAR35	RJ	1	1	1	1	4
	Commercial Jets Subtotal	**131,184**	**31,779**	**136,894**	**26,069**	**325,926**
Commercial Non-Jet Operations						
BEC58P	Non-jet	16,256	361	16,557	61	33,235
DHC8	Non-jet	43	0	43	0	87
DHC830	Non-jet	3,400	158	3,323	236	7,117
PA42	Non-jet	190	3	193	0	386
SF340	Non-jet	1,719	0	1,719	0	3,438
	Commercial Non-Jet Operations Subtotal	**21,609**	**522**	**21,835**	**296**	**44,264**
	Commercial Aircraft Total	**152,793**	**32,302**	**158,729**	**26,366**	**370,190**
General Aviation Operations						
A109	Helicopter	17	1	17	1	36
B206L	Helicopter	2	0	2	0	4
B407	Helicopter	2	0	2	0	4
B429	Helicopter	4	0	4	0	8
B430	Helicopter	2	0	2	0	4
EC130	Helicopter	8	0	8	1	17
H500D	Helicopter	1	0	1	0	2
S76	Helicopter	116	11	107	20	254
SA330J	Helicopter	170	9	166	13	358
SA350D	Helicopter	3	0	3	0	6
SA355F	Helicopter	2	0	2	0	4
SA365N	Helicopter	2	0	2	0	4
747400	Heavy Jet A	0	1	0	1	2
747SP	Heavy Jet A	1	1	2	1	6
767300	Heavy Jet B	2	0	2	0	4
A330-301	Heavy Jet B	2	0	2	0	4
727EM1	Light Jet A	2	0	1	1	4
727EM2	Light Jet A	0	1	1	0	2
737400	Light Jet B	18	8	20	6	51

Table H-1c 2017 Annual Modeled Operations (Continued)

		Arrivals		Departures		
ANP Type	**Group**	**Day**	**Night**	**Day**	**Night**	**Total**
General Aviation Operations, continued						
737700	Light Jet B	12	1	12	1	26
737N17	Light Jet B	0	1	0	1	2
757300	Light Jet B	1	0	0	1	2
757RR	Light Jet B	0	1	1	0	2
A319-131	Light Jet B	3	0	2	1	6
A320-211	Light Jet B	1	0	1	0	2
EMB190	Light Jet B	3	1	4	0	8
MD81	Light Jet B	1	2	0	3	6
BD-700-1A10	RJ	351	35	347	39	772
BD-700-1A11	RJ	97	14	103	8	220
CIT3	RJ	30	2	28	4	64
CL600	RJ	1,269	103	1,289	83	2,745
CL601	RJ	203	21	208	16	448
CNA500	RJ	138	17	146	10	311
CNA510	RJ	86	10	85	11	192
CNA525C	RJ	266	51	293	23	633
CNA55B	RJ	629	60	634	54	1,377
CNA560E	RJ	148	9	151	7	315
CNA560U	RJ	904	77	918	64	1,963
CNA560XL	RJ	202	13	202	13	430
CNA680	RJ	619	46	639	26	1,330
CNA750	RJ	1,465	148	1,493	119	3,225
ECLIPSE500	RJ	40	0	39	1	79
EMB145	RJ	31	2	33	0	66
EMB14L	RJ	22	1	24	0	47
GIV	RJ	575	49	578	47	1,249
GV	RJ	491	73	519	45	1,128
IA1125	RJ	182	9	184	8	382
LEAR35	RJ	1,177	129	1,178	128	2,611
MU3001	RJ	473	27	470	30	1,000
1900D	Non-jet	4	0	4	0	8
BEC58P	Non-jet	705	44	703	46	1,498
CNA172	Non-jet	29	0	29	0	58
CNA182	Non-jet	71	1	71	1	143
CNA206	Non-jet	20	0	20	0	40
CNA208	Non-jet	1,272	267	1,441	98	3,078
CNA441	Non-jet	37	5	41	2	85
COMSEP	Non-jet	352	52	375	30	808
DHC6	Non-jet	856	97	854	98	1,905
DHC8	Non-jet	2	0	2	0	4

Table H-1c 2017 Annual Modeled Operations (Continued)

		Arrivals		Departures		
ANP Type	**Group**	**Day**	**Night**	**Day**	**Night**	**Total**
General Aviation						
DO328	Non-jet	7	0	7	0	13
EMB120	Non-jet	2	0	2	0	4
GASEPF	Non-jet	21	0	21	0	41
GASEPV	Non-jet	208	6	205	9	428
PA28	Non-jet	23	0	23	0	45
PA30	Non-jet	7	1	8	0	15
PA42	Non-jet	25	0	24	2	51
SF340	Non-jet	770	2	767	5	1,545
	General Aviation Total	**14,180**	**1,410**	**14,514**	**1,077**	**31,181**
	Grand Total	**166,974**	**33,712**	**173,243**	**27,443**	**401,371**

Source: HMMH, 2018.
Notes: ANP - Aircraft Noise and Performance.
BEC58P is the AEDT substitution for the Cessna 402.
The CRJ9-ER in the RJ category is the CRJ700 aircraft.
Annual operations modeled in the 2017 annual contour.
Some totals may not match due to rounding.

In the calculation of DNL, annual operations data are scaled to represent an average annual day by dividing by the 365 days in a year. To compare operations between years, it is simpler to look at category totals. **Tables H-2a, H-2b,** and **H-2c** summarizes the numbers of average daily operations by categories of aircraft operating at Logan Airport from 1990 through 2019. Operations are summarized by operator category (commercial/GA), aircraft category, and day or night operation (night defined as 10:00 PM to 7:00 AM, consistent with the definition of DNL). GA operations were not included in the noise modeling prior to 1998 and commercial jet operations were not separated until 1999.

Table H-2a Modeled Daily Operations[1] by Commercial and General Aviation (GA) Aircraft – 1990 to 2000

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Commercial Aircraft												
Stage 2 Jets[2]	Day	312.40	N/A	228.89	203.34	189.40	156.90	132.40	108.46	84.93	83.30	5.13
	Night	19.99	N/A	13.13	7.44	10.10	5.50	4.79	7.75	5.92	6.66	0.26
	Total	**332.39**	N/A	**242.02**	**210.78**	**199.50**	**162.40**	**137.19**	**116.21**	**90.85**	**89.96**	**5.39**
Stage 3 Jets	Day	288.89	N/A	384.49	418.99	425.70	429.40	439.81	505.08	541.43	597.28	727.09
	Night	57.25	N/A	58.29	65.47	62.80	69.00	80.16	85.06	95.54	98.59	103.66
	Total	**346.14**	N/A	**442.78**	**484.46**	**488.50**	**498.40**	**519.97**	**590.14**	**636.97**	**695.87**	**830.75**
Air Carrier Jets	Day	N/A[3]	N/A	N/A[3]	N/A[3]	N/A[3]	N/A[3]	N/A[3]	N/A[3]	N/A[3]	569.18	648.95
	Night	N/A[3]	N/A	N/A[3]	N/A[3]	N/A[3]	N/A[3]	N/A[3]	N/A[3]	N/A[3]	96.21	99.79
	Total	**N/A[3]**	N/A	**N/A[3]**	**N/A[3]**	**N/A[3]**	**N/A[3]**	**N/A[3]**	**N/A[3]**	**N/A[3]**	**665.39**	**748.74**
Regional Jets[5]	Day	N/A[3]	N/A	N/A[3]	N/A[3]	N/A[3]	N/A[3]	N/A[3]	N/A[3]	N/A[3]	28.10	78.14
	Night	N/A[3]	N/A	N/A[3]	N/A[3]	N/A[3]	N/A[3]	N/A[3]	N/A[3]	N/A[3]	2.38	3.87
	Total	**N/A[3]**	N/A	**N/A[3]**	**N/A[3]**	**N/A[3]**	**N/A[3]**	**N/A[3]**	**N/A[3]**	**N/A[3]**	**30.48**	**82.01**
Non-jets	Day	444.41	N/A	411.84	598.16	541.97	526.85	505.31	514.7	552.56	448.82	409.62
	Night	11.72	N/A	69.32	46.84	13.59	11.14	13.73	27.27	21.86	16.63	21.58
	Total	**456.13**	N/A	**481.16**	**645.00**	**555.56**	**537.99**	**519.04**	**541.97**	**574.42**	**465.45**	**431.20**
Total Commercial Operations												
Operations	Day	1045.70	N/A	1,025.22	1,220.49	1,157.07	1,113.15	1,077.52	1,128.24	1,178.92	1,129.90	1,141.84
	Night	88.96	N/A	140.74	119.75	86.49	85.64	98.68	120.08	123.32	121.88	125.51
	Total	**1,134.66**	N/A	**1,165.96**	**1,340.24**	**1,243.56**	**1,198.79**	**1,176.20**	**1,248.32**	**1,302.24**	**1,251.78**	**1,267.35**
GA Aircraft												
Stage 2 Jets[2]	Day	N/A[4]	N/A	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	5.25	9.89	7.29
	Night	N/A[4]	N/A	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	0.40	0.74	0.64
	Total	**N/A[4]**	N/A	**N/A[4]**	**N/A[4]**	**N/A[4]**	**N/A[4]**	**N/A[4]**	**N/A[4]**	**5.65**	**10.63**	**7.93**
Stage 3 Jets	Day	N/A[4]	N/A	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	30.54	48.46	40.08
	Night	N/A[4]	N/A	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	4.21	6.55	3.21
	Total	**N/A[4]**	N/A	**N/A[4]**	**N/A[4]**	**N/A[4]**	**N/A[4]**	**N/A[4]**	**N/A[4]**	**34.75**	**55.01**	**43.29**
Non-jets	Day	N/A[4]	N/A	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	37.29	19.36	34.57
	Night	N/A[4]	N/A	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	16.28	18.89	1.83
	Total	**N/A[4]**	N/A	**N/A[4]**	**N/A[4]**	**N/A[4]**	**N/A[4]**	**N/A[4]**	**N/A[4]**	**53.57**	**38.25**	**36.40**

Table H-2a Modeled Daily Operations1 by Commercial and General Aviation (GA) Aircraft – 1990 to 2000 (Continued)

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Total GA Operations												
Operations	Day	N/A[4]	N/A	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	73.08	77.71	81.94
	Night	N/A[4]	N/A	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	N/A[4]	20.89	26.17	5.68
	Total	**N/A[4]**	N/A	**N/A[4]**	**N/A[4]**	**N/A[4]**	**N/A[4]**	**N/A[4]**	**N/A[4]**	**93.97**	**103.88**	**87.62**
Overall totals												
Total	Day	1,045.70	N/A	1,025.22	1,220.49	1,157.07	1,113.15	1,077.52	1,128.24	1,252.00	1,207.61	1,223.78
	Night	88.96	N/A	140.74	119.75	86.49	85.64	98.68	120.08	144.21	148.05	131.19
	Total[4]	**1,134.66**	N/A	**1,165.96**	**1,340.24**	**1,243.56**	**1,198.79**	**1,176.20**	**1,248.32**	**1,396.21**	**1,355.66**	**1,354.97**

Table H-2b Modeled Daily Operations[1] by Commercial and General Aviation (GA) Aircraft – 2001 to 2011

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Commercial Aircraft												
Stage 2 Jets[2]	Day	1.18	0.05	0.08	0.03	0.05	0.03	0.03	0.01	0.00	0.01	0.01
	Night	0.05	0.00	0.00	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.00
	Total	**1.23**	**0.05**	**0.08**	**0.05**	**0.06**	**0.03**	**0.04**	**0.02**	**0.00**	**0.02**	**0.01**
Stage 3 Jets	Day	756.24	740.75	717.85	772.39	765.76	767.55	748.13	699.39	667.45	674.25	684.19
	Night	109.77	97.04	92.69	113.24	113.66	114.81	118.29	114.30	103.05	107.92	109.38
	Total	**866.01**	**837.79**	**810.54**	**885.63**	**879.42**	**882.36**	**866.42**	**813.69**	**770.50**	**782.17**	**793.57**
Air Carrier Jets	Day	569.99	500.70	461.06	518.96	505.48	490.63	472.39	443.15	422.92	521.64	571.03
	Night	101.30	83.52	72.69	89.24	91.99	92.71	96.28	89.89	82.21	93.98	99.17
	Total	**671.29**	**584.22**	**533.75**	**608.20**	**597.47**	**583.34**	**568.66**	**533.04**	**505.14**	**615.62**	**670.2**
Regional Jets[5]	Day	186.25	240.05	256.80	253.43	260.34	276.95	275.77	256.24	244.53	152.61	113.16
	Night	8.47	13.52	19.99	24.00	21.68	22.11	22.03	24.40	20.84	13.94	10.21
	Total	**194.72**	**253.57**	**276.79**	**277.43**	**282.01**	**299.06**	**297.80**	**280.64**	**265.37**	**166.55**	**123.37**
Non-jets	Day	317.62	165.45	135.18	133.24	148.77	140.81	145.27	132.52	136.43	138.53	135.18
	Night	10.97	3.45	2.41	3.03	3.02	3.26	3.47	4.00	5.56	5.21	4.73
	Total	**328.58**	**168.89**	**137.59**	**136.28**	**151.79**	**144.07**	**148.73**	**136.52**	**141.99**	**143.74**	**139.91**

Table H-2b Modeled Daily Operations[1] by Commercial and General Aviation (GA) Aircraft – 2001 to 2011 (Continued)

		2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total Commercial Operations												
Operations	Day	1,075.04	906.25	853.10	905.66	914.59	908.41	893.43	831.92	804.77	812.78	819.39
	Night	120.79	100.49	95.10	116.29	116.68	118.09	121.77	118.31	108.65	113.13	114.11
	Total	**1,195.82**	**1,006.73**	**948.20**	**1,021.95**	**1,031.27**	**1,026.51**	**1,015.19**	**950.23**	**913.42**	**925.91**	**933.5**
GA Aircraft												
Stage 2 Jets[2]	Day	5.15	3.65	2.84	0.94	2.29	1.90	1.24	0.36	0.09	0.27	0.08
	Night	0.50	0.41	0.26	0.14	0.25	0.17	0.19	0.03	0.01	0.04	0.00
	Total	**5.65**	**4.08**	**3.10**	**1.08**	**2.54**	**2.07**	**1.43**	**0.38**	**0.10**	**0.30**	**0.08**
Stage 3 Jets	Day	34.23	37.83	46.21	53.72	58.84	61.08	54.82	43.98	22.31	27.80	52.51
	Night	3.28	6.42	6.98	8.37	9.33	6.57	6.39	4.52	2.28	3.21	5.35
	Total	**37.51**	**44.25**	**53.19**	**62.09**	**68.16**	**67.65**	**61.21**	**48.49**	**23.59**	**31.01**	**57.87**
Non-jets	Day	37.31	17.36	17.81	16.95	14.00	15.05	11.98	15.13	8.19	8.19	18.18
		2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
	Night	1.92	4.45	4.40	5.20	4.75	1.39	3.61	1.08	0.74	0.72	1.29
	Total	**39.23**	**21.81**	**22.21**	**22.14**	**18.75**	**16.44**	**15.58**	**16.20**	**8.93**	**8.92**	**19.48**
Total GA Operations												
Operations	Day	76.68	58.84	66.88	71.60	75.12	78.03	68.04	59.46	30.46	36.26	70.78
	Night	5.71	11.29	11.64	13.71	14.33	8.13	10.19	5.62	3.08	3.97	6.65
	Total	**82.39**	**70.13**	**78.52**	**85.31**	**89.46**	**86.15**	**78.22**	**65.05**	**33.54**	**40.22**	**77.43**
Overall totals												
Total	Day	1,151.72	965.09	919.98	977.27	989.71	986.43	961.46	891.39	834.33	849.03	890.16
	Night	126.50	111.78	106.74	130.00	131.02	126.22	131.96	123.93	111.70	117.10	120.76
	Total[4]	**1,278.21**	**1,076.86**	**1,026.72**	**1,107.26**	**1,120.73**	**1,112.66**	**1,093.42**	**1,015.31**	**946.03**	**966.13**	**1,010.92**

Table H-2c Modeled Daily Operations[1] by Commercial and General Aviation (GA) Aircraft – 2012 to 2019

		2012	2013	2014	2015	2016[6]	2017	2018	2019	Change 2017 to 2018	Change 2018 to 2019
Commercial Aircraft											
Stage 2 Jets[2]	Day	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Night	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.01**	**0.01**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	0.00	0.00
Stage 3 Jets	Day	649.22	667.65	670	685.92	713.65	734.46	770.67	779.05	36.21	8.38
	Night	106.55	115.91	123.6	130.96	142.16	158.49	177.15	186.25	18.66	9.10
	Total	**755.77**	**783.56**	**793.61**	**816.88**	**855.81**	**892.95**	**947.82**	**965.30**	54.87	17.48
Air Carrier Jets	Day	530.76	546.27	556.59	585.55	620.45	636.04	657.25	655.57	21.21	-1.68
	Night	98.68	107.17	115.84	126.36	134.93	148.75	164.09	174.30	15.34	10.21
	Totals	**629.44**	**653.44**	**672.43**	**711.92**	**755.38**	**784.79**	**821.34**	**829.87**	36.54	8.53
Regional Jets[5]	Day	118.46	121.38	113.41	100.36	93.20	98.42	113.42	123.48	15.00	10.06
	Night	7.87	8.74	7.77	4.6	7.23	9.74	13.06	11.95	3.32	(1.12)
	Total	**126.33**	**130.12**	**121.18**	**104.96**	**100.43**	**108.16**	**126.48**	**135.43**	18.33	8.94
Non-jets	Day	133.92	132.33	128.45	125.27	125.88	119.03	126.76	124.11	7.74	(2.66)
	Night	3.06	3.21	2.28	2.41	3.01	2.24	2.36	1.70	0.11	(0.66)
	Total	**136.98**	**135.54**	**130.73**	**127.68**	**128.89**	**121.27**	**129.12**	**125.81**	7.85	(3.31)
Total Commercial Operations											
Operations	Day	783.14	799.99	798.45	811.19	839.53	853.49	897.44	903.16	43.95	5.72
		2012	**2013**	**2014**	**2015**	**2016[6]**	**2017**	**2018**	**2019**	**Change 2017 to 2018**	**Change 2018 to 2019**
	Night	109.62	119.12	125.88	133.37	145.17	160.73	179.51	187.95	18.78	8.44
	Total	**892.76**	**919.12**	**924.33**	**944.56**	**984.70**	**1,014.22**	**1,076.94**	**1,091.11**	62.72	14.16
GA Aircraft											
Stage 2 Jets[2]	Day	0.25	0.31	0.00	0.28	0.00	0.00	0.00	0.00	0.00	0.00
	Night	0.04	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
	Total	**0.29**	**0.33**	**0.00**	**0.30**	**0.00**	**0.00**	**0.00**	**0.00**	0.00	0.00
Stage 3 Jets	Day	52.93	51.21	52.64	51.82	51.82	52.19	55.77	53.17	3.69	(2.60)
	Night	7.20	5.10	4.65	4.28	4.59	4.56	5.08	4.79	0.52	(0.29)
	Total	**60.13**	**56.31**	**57.29**	**56.10**	**56.41**	**56.75**	**60.85**	**57.96**	4.21	(2.89)

Table H-2c Modeled Daily Operations1 by Commercial and General Aviation (GA) Aircraft – 2012 to 2019 (Continued)

		2012	2013	2014	2015	2016[6]	2017	2018	2019	Change 2017 to 2018	Change 2018 to 2019
Non-jets	Day	15.16	13.06	13.95	19.31	25.92	26.43	22.01	19.37	(4.42)	(2.64)
	Night	1.29	1.15	1.13	1.46	1.87	2.25	1.91	1.90	(0.34)	0.00
	Total	**16.45**	**14.22**	**15.08**	**20.77**	**27.79**	**28.68**	**23.92**	**21.28**	(4.76)	(2.64)
Total GA Operations											
Operations	Day	68.35	64.58	66.59	71.40	77.75	78.61	77.78	72.54	(0.72)	(5.24)
	Night	8.52	6.28	5.78	5.77	6.46	6.81	6.99	6.70	0.17	(0.29)
	Total	**76.86**	**70.85**	**72.37**	**77.17**	**84.21**	**85.43**	**84.77**	**79.24**	(0.55)	(5.53)
Overall Totals											
Total	Day	851.49	864.57	865.05	882.59	917.28	932.10	975.22	975.70	43.22	0.49
	Night	118.13	125.40	131.66	139.14	151.63	167.54	186.49	194.64	18.95	8.15
	Total[4]	**969.61**	**989.97**	**996.70**	**1,021.73**	**1,068.91**	**1,099.65**	**1,161.71**	**1,170.35**	62.17	8.64

Source: Massport's Noise Monitoring System and Revenue Office numbers, HMMH 2020.

Notes: N/A - Not available. Data from 1991 not available. Sums may be off slightly due to rounding. Negative numbers shown in parentheses ( ).

1 Includes scheduled and unscheduled operations.

2 Stage 2 aircraft are no longer permitted, effective December 31, 2015.

3 Regional Jet (RJ) operations were not tracked separately prior to 1999.

4 Totals prior to 1998 do not include GA operations.

5 RJ prior to 2010 was a jet with 100 seats or less. RJ in 2010 is a jet with less than 80 seats.

6 Minor errors reported for 2016 data in *2016 EDR* have been corrected in this table.

Commercial Jet Aircraft by Part 36 Stage Category

As described in the Regulatory Framework section of this appendix, jet aircraft are classified into categories referred to as stages based on noise levels. The heavier the aircraft, the more noise it is permitted to make within limits. Aircraft are allowed to be recertificated to the higher standard when modifications are made to the aircraft engine or design. Because of the substantial differences in noise between Stage 2, recertificated Stage 3, Stage 3, Stage 4, and Stage 5 aircraft, Massport tracks operations by these separate categories to follow their trends. **Table H-3** shows the percentage of commercial jet operations by stage category from 1998 through 2019.

One of the most significant changes occurring after the economic downturn in 2001 was the almost immediate retirement of the re-certificated Stage 3 aircraft from airlines' fleets due to their high operating costs. This type of accelerated retirement was not as prevalent during the 2008 to 2009 economic downturn since the major airlines no longer operated these aircraft.

Nighttime Operations

Massport tracks flights that operate in the defined nighttime period between the hours of 10:00 PM to 7:00 AM, when each flight is penalized 10 dB in calculations of DNL. **Table H-4** shows this nighttime activity by different groups of aircraft. Nighttime flights by commercial jet operators increased by 11.8 percent in 2018 and 5.1 percent in 2019 over the previous year, respectively. This follows increases of 6.6 percent in 2014, 5.9 percent in 2015, 8.9 percent in 2016, and 11.5 percent in 2017. Commercial non-jet operations increased slightly in 2018 and then decreased again in 2019, remaining, on average, less than four operations per night since 2012. GA nighttime traffic also remained fairly steady in 2018 and 2019, with, on average, less than seven operations per night since 2012. Overall, nighttime operations at Logan Airport increased by 11.3 percent in 2018 and 4.4 percent in 2019 over the previous year, respectively, after increasing 5.0 percent in 2014, 5.7 percent in 2015, 9.3 percent in 2016, and 10.2 percent in 2017. As in years past, the majority of 2017 nighttime operations (between 10:00 PM and 7:00 AM) occurred either before midnight or after 5:00 AM.

Table H-3 Percentage of Commercial Jet Operations by Part 36 Stage Category – 1998 to 2019

	Stage 5 Requirements[1]	Stage 4 Requirements[2]	Stage 3[3]	Recertificated Stage 3[4]	Stage 2 Greater than 75,000 lbs.	Total
1998	N/A	N/A	65.9%	21.7%	12.4%	100%
1999	N/A	N/A	70.0%	21.0%	9.0%	100%
2000	N/A	N/A	75.0%	24.0%	1.0%	100%
2001	N/A	N/A	86.3%	13.6%	0.1%	100%
2002	N/A	N/A	92.8%	7.2%	0.0%	100%
2003	N/A	N/A	95.8%	4.1%	0.0%	100%
2004	N/A	N/A	97.8%	2.2%	0.0%	100%
2005	N/A	N/A	98.0%	2.0%	0.0%	100%
2006	N/A	N/A	98.6%	1.4%	0.0%	100%
2007	N/A	N/A	98.9%	1.1%	0.0%	100%
2008	N/A	N/A	99.1%	0.9%	0.0%	100%
2009	N/A	87.8%	11.3%	0.9%	0.0%	100%
2010	N/A	93.2%	5.7%	1.1%	0.0%	100%
2011	N/A	95.5%	4.0%	0.5%	0.0%	100%
2012	N/A	95.8%	4.1%	0.1%	0.0%	100%
2013	N/A	97.4%	2.6%	0.0%	0.0%	100%
2014	N/A	97.4%	2.6%	0.0%	0.0%	100%
2015	N/A	96.7%	3.3%	0.0%	0.0%	100%
2016	17.8%	79.2%	3.0%	0.0%	0.0%	100%
2017	17.7%	79.8%	2.4%	0.0%	0.0%	100%
2018	15.5%	83.0%	1.5%	0.0%	0.0%	100%
2019	15.2%	82.9%	2.0%	0.0%	0.0%	100%

Source: Massport and Federal Aviation Administration (FAA) radar data, HMMH 2020.

Notes: N/A – not applicable.

1 This column includes operations by aircraft that would qualify as Stage 5 recertificated. Aircraft with maximum takeoff weight greater than 121,254 lbs certificated after January 1, 2018 must meet Stage 5 standards. The percent of Logan Airport operations in aircraft meeting Stage 5 requirements was not determined prior to 2016.

2 Aircraft that meet Stage 4 requirements are aircraft that are either certificated Stage 4 or would qualify if recertificated. Certificated Stage 4 aircraft were not available until 2006 and the percent of Logan Airport operations in aircraft that meet Stage 4 requirements was not determined prior to 2009.
Values less than 0.05% appear as 0.0% due to rounding.

3 Certificated Stage 3 aircraft are originally manufactured meeting Stage 3 requirements under Federal Regulation Part 36. This column includes only operations by Certificated Stage 3 aircraft that do not meet higher certification standards.

4 Recertificated Stage 3 aircraft are aircraft originally manufactured as a certified Stage 1 or 2 aircraft under Federal Regulation Part 36, which either have been treated with hushkits or have been re-engineered to meet Stage 3 requirements.

Table H-4 Modeled Nighttime Operations at Logan Airport – 1990 to 2019

	Commercial Jets	Commercial Non-Jets	General Aviation	Total
1990	77.24	11.72	N/A	88.96
1991	N/A	N/A	N/A	N/A
1992	71.42	69.32	N/A	140.74
1993	72.91	46.84	N/A	119.75
1994	72.90	13.59	N/A	86.49
1995	74.50	11.14	N/A	85.64
1996	84.95	13.73	N/A	98.68
1997	92.81	27.27	N/A	120.08
1998	101.46	21.86	20.89[1]	144.21
1999	105.25	16.63	26.17	148.05
2000	103.92	21.58	5.68	131.19
2001	109.82	10.97	5.71	126.50
2002	97.04	3.45	11.29	111.78
2003	92.69	2.41	11.64	106.74
2004	113.26	3.03	13.71	130.00
2005	113.67	3.02	14.33	131.02
2006	114.81	3.26	8.13	126.22
2007	118.30	3.47	10.19	131.96
2008	114.31	4.00	5.62	123.93
2009	103.05	5.56	3.08	111.70
2010	107.93	5.21	3.97	117.10
2011	109.38	4.73	6.65	120.76
2012	106.55	3.06	8.52	118.13
2013	115.91	3.21	6.28	125.40
2014	123.60	2.28	5.78	131.66
2015	130.96	2.41	5.77	139.14
2016[2]	142.16	3.01	6.48	151.63
2017	158.49	2.24	6.81	167.55
2018	177.15	2.36	6.99	186.49
2019	186.25	1.70	6.70	194.64
Change (2017 to 2018)	18.66	0.12	0.18	18.95
Percent Change	11.8%	5.2%	2.6%	11.3%
Change (2018 to 2019)	9.10	(0.66)	(0.29)	8.15
Percent Change	5.1%	(27.9%)	(4.2%)	4.4%

Source: Massport, HMMH, 2020.

Notes: GA – general aviation; N/A - not available. Negative numbers shown in parentheses ( ).

1 Previously reported as N/A. 1998 was the first year GA operations were reported and included in the total nighttime operations.

2 Minor errors reported for 2016 data in *2016 EDR* have been corrected in this table.

Runway Use

Using radar data, the AEDT pre-processor determines which runway was used, the specific aircraft type, and time classification (daytime or nighttime) for each flight. Massport compares annual runway use to previous years using a variety of summary tables with different perspectives.

The first summary of daytime and nighttime runway usages presented here is broken into six representative aircraft groups with similar runway requirements. The list below provides example aircraft types from each group:

- Heavy Jet A – B747s, A340s, A380s;
- Heavy Jet B – B767s, B777s, B787s, A300s, A310s, A330s, A350s, MD-11s;
- Light Jet A – B717s, B737-800s, MD-90s;
- Light Jet B – B737s, B757s, A319s, A320s, MD-80s, E190;
- Regional Jet (RJ) – E135, E145, E170, E175, CRJ2, CRJ7, CRJ9, J328 and Corporate Jets; and
- Turboprops and Piston Aircraft (non-jets).

Tables H-5a and **H-5b** show the runway use summary from the modeled 2019 and 2018 noise conditions, respectively. **Table H-5c** shows the corresponding summary from the modeled 2017 noise conditions for comparison. The turbojet aircraft in the table were grouped into the different categories for reporting purposes. Because the DNL contours developed using the NOMS data with the AEDT pre-processor reflect the actual use of the runways by each flight, they accurately represent Logan Airport's noise environment. The modeled runway use for each particular aircraft type may be different from the overall group runway use presented in **Tables H-5a, H-5b,** and **H-5c**.

Comparing **Table H-5a** (2019) with the similar **Table H-5b** (2018) shows the largest changes were in the Heavy Jet A group, nighttime arrivals and Light Jet A group, nighttime departures. All categories (except Heavy Jet A) show less use of Runway 22L and greater use of Runway 33L for arrivals. All categories show less use of Runway 22R and greater use of Runway 33L for departures.

In turn, comparing **Table H-5b** (2018) to **Table H-5c** (2017) shows that the largest changes were increases in the use of Runway 4R-22L for arrivals and of Runways 4R, 22L, and 22R for departures with corresponding decreases in the use of Runways 33L and 27 for both arrivals and departures. Runway 4R-22L was closed for 35 days in 2017, which explains its lower annual usage that year, rebounding in the following year when it was again available.

Table H-5a 2019 Modeled Runway Use by Aircraft Group

	Heavy Jet A		Heavy Jet B		Light Jet A		Light Jet B		Regional Jets		Non-Jets	
ARRIVALS												
Run way	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**
04L	0.14	0.00	0.28	0.20	2.50	0.20	4.13	0.43	8.29	0.82	25.54	3.23
04R	43.39	18.26	41.08	23.40	33.71	21.16	28.00	18.26	28.38	23.16	12.61	19.15
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00
15R	0.40	0.00	0.50	0.20	0.46	0.17	0.59	0.16	0.45	0.16	2.21	11.34
22L	29.50	54.49	26.96	35.61	22.79	39.34	28.80	38.74	24.80	40.25	25.93	30.05
22R	0.00	0.00	0.00	0.00	0.01	0.02	0.01	0.00	0.03	0.09	2.96	3.97
27	4.35	9.25	15.18	3.61	31.39	17.66	24.24	16.48	19.87	22.07	4.05	11.37
32	0.00	0.00	0.00	0.00	0.00	0.00	1.85	0.00	5.67	0.00	12.95	0.00
33L	22.22	18.00	16.01	36.98	9.14	21.46	12.40	25.94	12.51	13.44	7.62	16.14
33R	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.04	4.74
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
DEPARTURES												
Run way	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**
04L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.55	12.27
04R	16.26	10.06	11.93	4.01	8.80	5.80	3.33	2.25	0.21	0.43	2.92	2.30
9	5.74	0.77	18.92	15.05	26.49	16.25	32.97	20.55	38.51	26.27	18.72	8.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15R	30.91	44.27	10.36	18.83	3.47	14.32	2.06	10.59	0.49	6.28	2.24	23.67
22L	6.48	3.86	4.74	1.99	3.55	3.53	1.47	1.26	0.06	0.60	0.06	0.16
22R	14.29	11.44	24.63	32.62	25.82	20.47	28.80	29.41	30.37	33.04	29.61	29.59
27	0.08	0.00	6.85	1.86	10.55	23.13	11.56	20.33	11.27	20.64	5.16	3.55
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33L	26.23	29.61	22.58	25.64	21.32	16.50	19.80	15.61	19.09	12.74	20.73	20.46
33R	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Massport, HMMH, 2020.

Notes: Nighttime for noise modeling is defined as 10:00 PM to 7:00 AM.
Values may not add to 100 percent due to rounding.

Table H-5b 2018 Modeled Runway Use by Aircraft Group

	Heavy Jet A		Heavy Jet B		Light Jet A		Light Jet B		Regional Jets		Non-Jets	
ARRIVALS												
Runway	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**
04L	0.41	0.00	0.17	0.00	4.94	0.00	4.01	0.15	10.17	0.40	26.26	3.47
04R	43.03	28.17	41.68	22.71	31.10	27.10	31.92	21.55	27.04	24.10	13.76	22.37
9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00
15R	0.59	0.00	0.51	0.22	0.24	0.00	0.51	0.10	0.47	0.00	2.38	4.81
22L	32.74	28.15	28.92	40.68	31.14	42.48	29.29	42.13	28.61	45.41	29.39	38.16
22R	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.03	0.03	3.12	3.21
27	6.67	9.36	15.75	2.60	25.60	18.97	23.81	13.78	19.56	18.17	4.78	7.73
32	0.00	0.00	0.00	0.00	0.00	0.00	1.16	0.00	4.48	0.03	9.38	0.00
33L	16.55	34.32	12.97	33.79	6.98	11.44	9.30	22.29	9.66	11.85	6.41	16.68
33R	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.43	3.58
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
DEPARTURES												
Runway	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**
04L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	20.81	9.42
04R	9.22	3.68	10.80	3.31	0.44	0.16	4.85	3.24	0.55	0.38	4.15	1.70
9	5.72	5.52	17.96	12.94	35.77	27.48	31.33	19.41	37.62	25.36	19.27	10.60
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00
15L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15R	34.78	43.27	13.46	24.78	0.44	4.71	2.33	13.43	0.31	7.31	2.11	21.59
22L	8.67	3.07	5.40	2.11	0.00	0.49	1.98	1.66	0.05	0.44	0.04	0.14
22R	17.79	19.95	28.02	33.01	35.71	39.02	33.32	33.13	36.14	39.03	34.30	36.41
27	1.43	0.00	4.55	0.61	11.36	26.02	9.50	16.65	9.34	18.85	4.37	4.11
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33L	22.40	24.52	19.80	23.24	16.29	2.11	16.71	12.47	15.98	8.63	14.92	16.03
33R	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Massport, HMMH, 2020.

Notes: Nighttime for noise modeling is defined as 10:00 PM to 7:00 AM.
Values may not add to 100 percent due to rounding.

Table H-5c 2017 Modeled Runway Use by Aircraft Group

	Heavy Jet A		Heavy Jet B		Light Jet A		Light Jet B		Regional Jets		Non-Jets	
	ARRIVALS											
Runway	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**
04L	1.47	0.00	2.33	1.49	3.56	1.85	4.66	1.65	8.90	2.26	16.96	4.03
04R	30.73	22.06	30.11	13.13	25.28	12.55	22.76	12.06	18.54	14.18	9.72	9.78
09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.18	0.29
15R	7.22	3.59	6.30	3.33	5.05	3.22	4.78	3.30	4.17	2.64	4.60	4.00
22L	24.67	24.39	22.88	27.48	23.82	25.74	22.27	24.73	23.09	27.40	25.32	27.22
22R	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.04	0.00	2.55	1.15
27	8.07	3.44	20.44	5.42	30.98	22.43	29.99	25.94	23.61	31.74	7.27	14.64
32	0.00	0.00	0.00	0.00	0.00	0.00	1.48	0.01	6.08	0.16	14.15	0.00
33L	27.84	46.52	17.94	49.16	11.31	34.21	14.06	32.31	15.58	21.63	9.82	30.42
33R	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.43	8.47
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
	DEPARTURES											
Runway	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**	**Day (%)**	**Night (%)**
04L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.17	6.42
04R	5.64	3.86	7.13	2.05	0.65	0.36	2.66	1.31	0.16	0.35	3.74	0.81
09	6.44	4.92	14.85	10.10	29.26	17.65	27.13	15.25	31.70	19.35	17.44	9.02
14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00
15L	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
15R	30.52	26.79	16.32	21.90	1.33	10.22	3.25	14.61	0.40	9.29	1.51	20.17
22L	6.25	0.84	4.37	1.09	0.26	0.36	1.39	0.62	0.03	0.11	0.03	0.16
22R	17.15	16.44	23.02	21.32	30.93	25.66	28.77	19.97	31.84	26.24	30.73	22.78
27	1.90	0.00	7.42	1.54	17.81	35.64	13.04	28.26	14.62	28.33	6.95	5.51
32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
33L	32.10	47.15	26.91	41.99	19.75	10.11	23.76	19.98	21.25	16.35	24.37	35.14
33R	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Massport, HMMH, 2018.
Notes: Night for noise modeling is defined as 10:00 PM to 7:00 AM.
Values may not add to 100 percent due to rounding.

While **Tables H-5a** through **H-5c** present runway use by aircraft groups, **Tables H-6a, H-6b,** and **H-6c** present the total runway use (jets and non-jets) by runway and time of day. The first section of the table displays the number of operations on each runway by time period for an average day. The second section displays the same information for the entire year and the last section displays the percent that each runway is used for a given operation type and time of day.

Table H-6a shows that on an average day in 2019, Runways 9 and 22R were balanced for the most departures (167 each, per day and night combined) and Runway 22L had the most arrivals (almost 170 per day and night combined). **Table H-6b** shows that on an average day in 2018, Runway 22R alone had the most departures (over 195 per day and night combined) and Runway 22L was the leading arrival runway (183 per day and night combined). In comparison, **Table H-6c** shows that on an average day in 2017, Runway 22R had the most departures (with almost 155 per day and night combined) while Runway 27 was the dominant arrival runway (with over 135 per day and night combined).

Table H-6a Summary of Jet and Non-Jet Aircraft Runway Use: 2019

	Runway												
	4L	**4R**	**9**	**14**	**15L**	**15R**	**22L**	**22R**	**27**	**32**	**33L**	**33R**	**Total**
2019 Daily Operations													
Dep Day	14.8	18.9	150.7	0.0	0.0	12.6	7.1	141.9	50.6	0.0	100.0	0.0	496.5
Dep Night	0.2	2.6	17.0	0.0	0.0	11.2	1.5	25.5	15.4	0.0	15.3	0.0	88.6
Arr Day	36.8	131.2	0.0	0.0	0.1	3.8	129.4	2.2	98.1	18.7	56.2	4.3	480.6
Arr Night	0.5	20.4	0.0	0.0	0.0	0.4	40.4	0.1	16.9	0.0	25.8	0.1	104.5
Total Daily Operations	52.2	173.1	167.7	0.0	0.1	27.9	178.3	169.7	181.0	18.7	197.3	4.4	1,170.3
2019 Annual Operations													
Dep Day	5,384	6,882	55,019	0	1	4,593	2,586	51,805	18,452	0	36,511	0	181,234
Dep Night	79	953	6,197	0	0	4,087	530	9,303	5,624	0	5,581	0	32,354
Arr Day	13,417	47,882	0	0	23	1,375	47,237	791	35,794	6,822	20,506	1,581	175,429
Arr Night	172	7,450	0	0	0	138	14,733	31	6,180	0	9,422	32	38,159
Total Annual Operations	19,052	63,167	61,216	0	24	10,193	65,087	61,930	66,050	6,822	72,020	1,614	427,176
2019 Percentage Operations													
Dep Day	3%	4%	30%	0%	<1%	3%	1%	29%	10%	0%	20%	0%	100%
Dep Night	<1%	3%	19%	0%	0%	13%	2%	29%	17%	0%	17%	0%	100%
Arr Day	8%	27%	0%	0%	<1%	1%	27%	<1%	20%	4%	12%	1%	100%
Arr Night	<1%	20%	0%	0%	0%	<1%	39%	<1%	16%	0%	25%	<1%	100%

Source: Massport Noise Office and HMMH 2020.

Notes: These data reflect actual counts or percentages of aircraft operations on each runway end. They should not be confused with effective runway use, which is used by the Preferential Runway Advisory System (PRAS) to derive recommendations for use of a particular runway.
Runway 14-32 is unidirectional: there are no arrivals to Runway 14 and no departures from Runway 32.
Values may not add to 100 percent due to rounding.

Table H-6b Summary of Jet and Non-Jet Aircraft Runway Use: 2018

	Runway												
	4L	**4R**	**9**	**14**	**15L**	**15R**	**22L**	**22R**	**27**	**32**	**33L**	**33R**	**Total**
2018 Daily Operations													
Dep Day	15.5	21.1	148.4	0.0	0.0	12.8	7.5	167.0	42.0	0.0	81.7	0.0	496.1
Dep Night	0.2	2.4	16.1	0.0	0.0	12.4	1.3	28.6	12.3	0.0	11.4	0.0	84.7
Arr Day	39.8	138.4	0.0	0.0	0.1	3.8	140.0	2.4	93.6	14.0	43.8	3.3	479.1
Arr Night	0.2	22.3	0.0	0.0	0.0	0.2	43.0	0.1	13.8	0.0	22.1	0.1	101.8
Total Daily Operations	55.7	184.2	164.5	0.0	0.1	29.2	191.8	198.1	161.6	14.0	159.1	3.4	1,161.7
2018 Annual Operations													
Dep Day	5,667	7,693	54,176	7	0	4,673	2,755	60,956	15,326	0	29,832	0	181,085
Dep Night	66	881	5,879	0	0	4,517	478	10,457	4,476	0	4,173	0	30,927
Arr Day	14,519	50,508	0	0	26	1,375	51,083	858	34,173	5,127	16,001	1,198	174,868
Arr Night	89	8,137	0	0	0	77	15,691	30	5,022	1	8,067	31	37,143
Total Annual Operations	20,341	67,220	60,055	7	26	10,642	70,006	72,300	58,996	5,128	58,073	1,229	424,024
2018 Percentage Operations													
Dep Day	3%	4%	30%	<1%	0%	3%	2%	34%	8%	0%	16%	0%	100%
Dep Night	<1%	3%	19%	0%	0%	15%	2%	34%	14%	0%	13%	0%	100%
Arr Day	8%	29%	0%	0%	<1%	1%	29%	<1%	20%	3%	9%	1%	100%
Arr Night	<1%	22%	0%	0%	0%	<1%	42%	<1%	14%	<1%	22%	<1%	100%

Source: Massport Noise Office and HMMH 2020.

Notes: These data reflect actual counts or percentages of aircraft operations on each runway end. They should not be confused with effective runway use, which is used by the Preferential Runway Advisory System (PRAS) to derive recommendations for use of a particular runway.

Runway 14-32 is unidirectional: there are no arrivals to Runway 14 and no departures from Runway 32.

Values may not add to 100 percent due to rounding.

Table H-6c Summary of Jet and Non-Jet Aircraft Runway Use: 2017

	Runway												
	4L	**4R**	**9**	**14**	**15L**	**15R**	**22L**	**22R**	**27**	**32**	**33L**	**33R**	**Total**
2017 Daily Operations													
Dep Day	11.1	12.4	122.0	0.1	0.0	15.5	5.3	138.9	57.6	0.0	111.8	0.0	474.6
Dep Night	0.1	1.0	11.1	0.0	0.0	11.5	0.5	15.8	17.9	0.0	17.4	0.0	75.2
Arr Day	32.5	94.1	0.0	0.0	1.6	21.8	105.1	1.9	112.7	18.8	63.6	5.4	457.5
Arr Night	1.6	11.3	0.0	0.0	0.0	3.0	23.3	0.0	22.9	0.0	30.0	0.2	92.4
Total Daily Operations	45.4	118.8	133.1	0.1	1.6	51.8	134.1	156.6	211.1	18.8	222.8	5.6	1,099.6
2017 Annual Operations													
Dep Day	4,058	4,524	44,529	19	0	5,653	1,922	50,703	21,012	0	40,822	0	173,243
Dep Night	40	357	4,051	0	0	4,181	170	5,761	6,550	0	6,333	0	27,443
Arr Day	11,867	34,355	0	0	575	7,957	38,366	689	41,130	6,848	23,229	1,957	166,974
Arr Night	595	4,122	0	0	3	1,103	8,488	12	8,357	7	10,939	86	33,712
Total Annual Operations	16,560	43,358	48,580	19	578	18,895	48,947	57,164	77,050	6,855	81,323	2,043	401,371
2017 Percentage Operations													
Dep Day	2%	3%	26%	<1%	0%	3%	1%	29%	12%	0%	24%	0%	100%
Dep Night	<1%	1%	15%	0%	0%	15%	1%	21%	24%	0%	23%	0%	100%
Arr Day	7%	21%	0%	0%	<1%	5%	23%	<1%	25%	4%	14%	1%	100%
Arr Night	2%	12%	0%	0%	<1%	3%	25%	<1%	25%	<1%	32%	<1%	100%

Source: Massport Noise Office and HMMH 2018.

Notes: These data reflect actual counts or percentages of aircraft operations on each runway end. They should not be confused with effective runway use, which is used by the Preferential Runway Advisory System (PRAS) to derive recommendations for use of a particular runway.

Runway 14-32 is unidirectional: there are no arrivals to Runway 14 and no departures from Runway 32.

Values may not add to 100 percent due to rounding.

Runway use can also be presented in terms of percent of total operations. **Table H-7** presents the 2019, 2018 and 2017 runway use for all operations which use Logan Airport, supplementing the information in **Tables H-5a, H5-5b,** and **H-5c** that separate runway use by aircraft group and time of day, and the data in **Tables H-6a, H-6b,** and **H-6c** which total the runway use by operation type and time of day.

For 2019, Runway 33L was the most active, with primarily jet departures, followed almost equally by five other runways: Runways 27, 22L, 4R, 22R, and 9. For 2018, Runway 22R was the most active, with primarily jet departures, followed by Runway 22L with primarily jet arrivals. In 2017, Runway 33L was the runway with the highest activity (a mix of jet arrivals and departures) with Runway 27 a very close second. Non-jets use Runways 4L and 22L most for arrivals, and Runway 22R most for departures; this was the case for each of the three years shown in **Table H-7**.

Table H-7 Total 2019, 2018, and 2017 Modeled Runway Use by All Operations

	Jet Arrivals		Non-Jet Arrivals		Jet Departures		Non-Jet Departures		All Operations
	Day	Night	Day	Night	Day	Night	Day	Night	
Runway				**2019 Operations**					
4L	1.6%	<0.1%	1.6%	<0.1%	0.0%	0.0%	1.3%	<0.1%	**4.5%**
4R	10.4%	1.7%	0.8%	<0.1%	1.4%	0.2%	0.2%	<0.1%	**14.8%**
9	0.0%	0.0%	0.0%	0.0%	11.7%	1.4%	1.1%	<0.1%	**14.3%**
14	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	**0.0%**
15L	0.0%	0.0%	<0.1%	0.0%	0.0%	0.0%	<0.1%	0.0%	**<0.1%**
15R	0.2%	<0.1%	0.1%	<0.1%	0.9%	0.9%	0.1%	<0.1%	**2.4%**
22L	9.5%	3.4%	1.6%	<0.1%	0.6%	0.1%	<0.1%	<0.1%	**15.2%**
22R	<0.1%	<0.1%	0.2%	<0.1%	10.3%	2.1%	1.8%	<0.1%	**14.5%**
27	8.1%	1.4%	0.2%	<0.1%	4.0%	1.3%	0.3%	<0.1%	**15.5%**
32	0.8%	0.0%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	**1.6%**
33L	4.3%	2.2%	0.5%	<0.1%	7.3%	1.3%	1.3%	<0.1%	**16.9%**
33R	0.0%	0.0%	0.4%	<0.1%	0.0%	0.0%	0.0%	0.0%	**0.4%**
Total	34.9%	8.8%	6.1%	0.2%	36.3%	7.4%	6.1%	0.2%	**100.0%**
Runway				**2018 Operations**					
4L	1.7%	<0.1%	1.7%	<0.1%	<0.1%	0.0%	1.3%	<0.1%	**4.8%**
4R	11.0%	1.9%	0.9%	<0.1%	1.5%	0.2%	0.3%	<0.1%	**15.9%**
9	0.0%	0.0%	0.0%	0.0%	11.5%	1.4%	1.2%	<0.1%	**14.2%**
14	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	<0.1%	0.0%	**<0.1%**
15L	0.0%	0.0%	<0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	**<0.1%**
15R	0.2%	<0.1%	0.2%	<0.1%	1.0%	1.0%	0.1%	<0.1%	**2.5%**
22L	10.2%	3.6%	1.9%	0.1%	0.6%	0.1%	<0.1%	<0.1%	**16.5%**
22R	<0.1%	<0.1%	0.2%	<0.1%	12.2%	2.4%	2.2%	0.1%	**17.1%**
27	7.8%	1.2%	0.3%	<0.1%	3.3%	1.0%	0.3%	<0.1%	**13.9%**
32	0.6%	<0.1%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	**1.2%**
33L	3.4%	1.9%	0.4%	<0.1%	6.1%	1.0%	1.0%	<0.1%	**13.7%**
33R	0.0%	0.0%	0.3%	<0.1%	0.0%	0.0%	0.0%	0.0%	**0.3%**
Total	34.9%	8.6%	6.4%	0.2%	36.3%	7.1%	6.4%	0.2%	**100.0%**

Table H-7 Total 2019, 2018, and 2017 Modeled Runway Use by All Operations (Continued)

	Jet Arrivals		Non-Jet Arrivals		Jet Departures		Non-Jet Departures		All Operations
	Day	Night	Day	Night	Day	Night	Day	Night	
Runway					**2017 Operations**				
4L	1.8%	0.1%	1.1%	<0.1%	0.0%	0.0%	1.0%	<0.1%	**4.1%**
4R	7.9%	1.0%	0.6%	<0.1%	0.9%	0.1%	0.2%	<0.1%	**10.8%**
9	0.0%	0.0%	0.0%	0.0%	9.9%	1.0%	1.2%	<0.1%	**12.1%**
14	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	<0.1%	0.0%	**<0.1%**
15L	0.0%	0.0%	0.1%	<0.1%	0.0%	0.0%	0.0%	0.0%	**0.1%**
15R	1.7%	0.3%	0.3%	<0.1%	1.3%	1.0%	0.1%	<0.1%	**4.7%**
22L	7.9%	2.0%	1.7%	0.1%	0.5%	<0.1%	<0.1%	<0.1%	**12.2%**
22R	<0.1%	0.0%	0.2%	<0.1%	10.6%	1.4%	2.0%	<0.1%	**14.2%**
27	9.8%	2.0%	0.5%	<0.1%	4.8%	1.6%	0.5%	<0.1%	**19.2%**
32	0.8%	<0.1%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	**1.7%**
33L	5.1%	2.6%	0.6%	0.1%	8.5%	1.5%	1.6%	0.1%	**20.3%**
33R	0.0%	0.0%	0.5%	<0.1%	0.0%	0.0%	0.0%	0.0%	**0.5%**
Total	35.0%	8.1%	6.6%	0.3%	36.5%	6.7%	6.7%	0.2%	**100.0%**

Source: Massport, HMMH, 2020.

Notes: Night for noise modeling is defined as 10:00 PM to 7:00 AM.
Nighttime runway restrictions are from 11:00 PM to 6:00 AM.
Values may not add to 100 percent due to rounding.

Table H-8 presents a historical summary of runway use by jets. Since 2009, the radar data have been analyzed with Massport's Harris NOMS. Data from 2001 through 2008 were compiled with Massport's PreFlight™ software, an analysis package used to access fleet, day/night splits, and runway use information from radar data. Data prior to 2001 were derived from Massport's original noise monitoring system, supplemented with field records. Note that Logan Airport Noise Rules prevent arrivals to Runway 22R and departures from Runway 4L by jet aircraft except for certain circumstances.

Table H-8 Summary of Jet Aircraft Runway Use – 1990 to 2019

Runway	4L	4R	9	14[1]	15R	22L	22R	27	32[1]	33L
1990										
Departures	0%[2]	3%	21%	N/A	10%	2%	36%	20%	N/A	7%
Arrivals	1%	25%	0%	N/A	2%	14%	0%	28%	N/A	29%
1992[2]										
Departures	0%	6%	31%	N/A	7%	2%	38%	10%	N/A	6%
Arrivals	1%	37%	0%	N/A	3%	12%	0%	30%	N/A	17%
1993										
Departures	0%	9%	33%	N/A	7%	3%	40%	4%	N/A	4%
Arrivals	2%	44%	0%	N/A	1%	11%	0%	28%	N/A	15%
1994										
Departures	0%	9%	33%	N/A	4%	3%	32%	12%	N/A	5%
Arrivals	3%	42%	0%	N/A	1%	8%	0%	27%	N/A	19%
1995										
Departures	0%	8%	36%	N/A	5%	5%	29%	11%	N/A	5%
Arrivals	3%	41%	0%	N/A	2%	8%	0%	27%	N/A	17%
1996										
Departures	0%	8%	32%	N/A	5%	6%	33%	12%	N/A	5%
Arrivals	2%	38%	0%	N/A	2%	11%	0%	29%	N/A	18%
1997										
Departures	0%	8%	30%	N/A	5%	6%	31%	15%	N/A	5%
Arrivals	2%	36%	0%	N/A	2%	9%	0%	30%	N/A	20%
1998										
Departures	0%	8%	35%	N/A	6%	5%	28%	14%	N/A	5%
Arrivals	2%	41%	0%	N/A	2%	7%	0%	28%	N/A	19%
1999										
Departures	0%	8%	31%	N/A	5%	4%	30%	15%	N/A	6%
Arrivals	3%	37%	0%	N/A	2%	10%	0%	28%	N/A	21%
2000										
Departures	0%	8%	35%	N/A	4%	3%	30%	15%	N/A	6%
Arrivals	4%	40%	0%	N/A	1%	7%	0%	28%	N/A	20%

Table H-8 Summary of Jet Aircraft Runway Use – 1990 to 2019 (Continued)

Runway	4L	4R	9	14[1]	15R	22L	22R	27	32[1]	33L
2001										
Departures	0%	7%	34%	N/A	4%	3%	35%	12%	N/A	5%
Arrivals	5%	36%	0%	N/A	1%	8%	0%	32%	N/A	18%
2002										
Departures	0%	4%	31%	N/A	6%	3%	35%	16%	N/A	6%
Arrivals	6%	31%	0%	N/A	1%	12%	0%	30%	N/A	21%
2003										
Departures	0%	4%	33%	N/A	7%	2%	34%	14%	N/A	6%
Arrivals	7%	33%	0%	N/A	1%	14%	0%	28%	N/A	18%
2004										
Departures	0%	5%	34%	N/A	10%	4%	24%	18%	N/A	6%
Arrivals	6%	34%	0%	N/A	1%	12%	0%	24%	N/A	23%
2005										
Departures	0%	5%	36%	N/A	7%	1%	31%	13%	N/A	7%
Arrivals	8%	33%	0%	N/A	1%	11%	0%	29%	N/A	17%
2006										
Departures	0%	4%	33%	0%	3%	1%	40%	13%	0%	6%
Arrivals	7%	29%	0%	0%	1%	14%	0%	33%	0.2%	16%
2007										
Departures	0%	5%	31%	0%	4%	1%	33%	7%	0%	19%
Arrivals	5%	31%	0%	0%	1%	15%	0%	36%	2%	11%
2008										
Departures	0%	6%	33%	<1%	3%	<1%	36%	6%	0%	16%
Arrivals	6%	30%	0%	0%	2%	17%	0%	33%	2%	11%
2009[3]										
Departures	0%	7%	32%	0%	3%	2%	34%	6%	0%	16%
Arrivals	7%	31%	0%	0%	3%	17%	0%	30%	1%	11%
2010										
Departures	0%	4%	28%	<1%	8%	2%	31%	10%	0%	17%
Arrivals	5%	28%	0%	0%	1%	15%	0%	32%	1%	16%
2011[4]										
Departures	0%	6%	36%	<1%	5%	2%	36%	7%	0%	7%
Arrivals	7%	37%	0%	0%	<1%	16%	0%	28%	1%	11%
2012[4]										
Departures	0%	6%	33%	<1%	5%	3%	38%	6%	0%	9%
Arrivals	6%	34%	0%	0%	1%	16%	0%	33%	<1%	9%
2013										
Departures	<1%	5%	30%	<1%	5%	2%	35%	12%	0%	12%
Arrivals	6%	29%	0%	0%	1%	16%	<1%	32%	1%	15%

Table H-8 Summary of Jet Aircraft Runway Use – 1990 to 2019 (Continued)

Runway	4L	4R	9	14[1]	15R	22L	22R	27	32[1]	33L
2014										
Departures	0%	5%	31%	<1%	5%	2%	28%	13%	0%	17%
Arrivals	5%	30%	0%	0%	2%	25%	<1%	21%	1%	16%
2015										
Departures	0%	4%	29%	<1%	5%	2%	32%	12%	0%	15%
Arrivals	5%	29%	0%	0%	2%	25%	<1%	23%	1%	16%
2016[5]										
Departures	0%	4%	30%	0%	6%	2%	27%	13%	0%	18%
Arrivals	4%	31%	0%	0%	1%	24%	<1%	23%	1%	16%
2017[6]										
Departures	0%	2%	25%	0%	5%	1%	28%	15%	0%	23%
Arrivals	5%	21%	0%	0%	5%	23%	<1%	27%	2%	18%
2018										
Departures	<1%	4%	30%	0%	5%	2%	34%	10%	0%	16%
Arrivals	4%	30%	0%	0%	<1%	32%	<1%	21%	1%	12%
2019										
Departures	0%	4%	30%	0%	4%	2%	28%	12%	0%	20%
Arrivals	4%	28%	0%	0%	<1%	29%	<1%	22%	2%	15%

Source: HMMH 2020, Massport Noise Office.

Notes: These data reflect actual percentages of jet aircraft operations on each runway end. They should not be confused with effective runway use, which is used by the Preferential Runway Advisory System (PRAS) to derive recommendations for use of a particular runway. Effective runway percentages include a factor of 10 applied to nighttime operations so that use of a runway at night more closely reflects its effect on total noise exposure.
Jet aircraft are not able to use Runway 15L or 33R due to its length of only 2,557 feet.
Values may not add to 100 percent due to rounding.
N/A - not available.

1 Runway 14-32 opened in late November 2006. (Runway 14-32 is unidirectional with no arrivals to Runway 14 and no departures from Runway 32.)

2 The *1990 Final Generic Environmental Impact Report* was published and submitted to the Secretary of Environmental Affairs in July 1993. It included modeled operations and resulting noise contours for 1987, 1990, and a 1996-forecast year. The *1993 Annual Update* published in July 1994 included operations and contours for 1992 and 1993. 1991 data are not available.

3 Runway 9-27 had extended weekend closings for resurfacing during 2009.

4 Runway 15R-33L was closed for 3 months in 2011 and in 2012.

5 Runway 4L-22Rwas closed for 31 days in 2016.

6 Runway 4R-22L was closed for 35 days in 2017, with limited availability for Runway 4R arrivals for about 80 additional days.

Since runway use plays such a key role in determining noise the aircraft noise distribution in the Airport's environment, Massport also tracks the level of traffic off each runway end by combining counts of operations that overfly the same general area. The total operations and percentages shown for 2017 through 2019 in **Table H-9** represent the amount of activity experienced off each runway end for a given year.

Table H-9 Runway Usage by Runway End

		2017		2018		2019	
Runway End	**Operation(s)[1]**	**Total Flights**	**% of Total[2]**	**Total Flights**	**% of Total[2]**	**Total Flights**	**% of Total[2]**
04L	R4L A + R22R D	68,925	**17.2%**	86,021	**20.3%**	74,697	**17.5%**
04R	R4R A + R22L D	40,570	**10.1%**	61,879	**14.6%**	58,449	**13.7%**
9	R9 A + R27 D	27,562	**6.9%**	19,802	**4.7%**	24,076	**5.6%**
14	N/A	0	**0.0%**	0	**0.0%**	0	**0.0%**
15L	R15L A + R33R D	578	**0.1%**	26	**0.0%**	23	**0.0%**
15R	R15R A + R33L D	56,216	**13.9%**	35,457	**8.4%**	43,606	**10.2%**
22L	R22L A + R4R D	51,735	**12.9%**	75,347	**17.8%**	69,805	**16.3%**
22R	R22R A + R4L D	4,799	**1.2%**	6,620	**1.6%**	6,285	**1.5%**
27	R27 A + R9 D	98,068	**24.5%**	99,250	**23.4%**	103,191	**24.2%**
32	R32 A + R14 D	6,874	**1.7%**	5,135	**1.2%**	6,822	**1.6%**
33L	R33L A + R15R D	44,001	**10.9%**	33,259	**7.8%**	38,607	**9.0%**
33R	R33R A + R15L D	2,043	**0.5%**	1,229	**0.3%**	1,615	**0.4%**
All		401,371	**100.0%**	424,024	**100.0%**	427,176	**100.0%**

Source: HMMH 2020, Massport Noise Office.

Notes: N/A – not applicable.

Runway 14-32 is unidirectional: there are no arrivals to Runway 14 and no departures from Runway 32. The 15 operations shown in this row for 2016 are non-jet departures which were most likely erroneously associated with Runway 32 by the computer algorithm.

1 A=Arrivals; D=Departures.

2 Percentages are rounded to the nearest tenth.

Flight Tracks

The AEDT pre-processor converts each radar track to an AEDT model track and then models the scaled aircraft operation on that track. This method keeps the modeled lateral and vertical dispersion of the aircraft types consistent with the radar data and ensures that anomalies in the departure paths are captured in the pre-processor system. **Table H-10** lists the number of flight tracks used in the modeling process for 2017, 2018 and 2019. A sample of flight tracks from 2018 and 2019 are displayed in **Figures 6-4** through **6-10** in Chapter 6, *Noise Abatement*.

Table H-10 Total Count of Flight Tracks Modeled with AEDT (2017, 2018, and 2019)

	Runway											
	4L	**4R**	**9**	**14**	**15L**	**15R**	**22L**	**22R**	**27**	**32**	**33L**	**33R**
2019												
Departures	5,392	7,660	60,003	0	1	8,481	3,042	59,892	23,548	0	41,222	0
Arrivals	13,149	52,055	0	0	23	1,421	58,33	819	39,151	6,634	28,222	1,610
2018												
Departures	5,718	8,559	60,032	7	0	9,190	3,230	71,355	19,790	0	33,970	0
Arrivals	14,254	56,777	0	0	25	1,350	64,554	870	37,831	5,033	23,244	1,203
2017												
Departures	4,098	4,881	48,580	19	0	9,484	2,093	56,463	27,562	0	47,155	0
Arrivals	12,462	38,477	0	0	578	8,711	46,854	701	49,488	6,855	34,167	2,043

Source: HMMH, 2020; Harris Noise and Operational Monitoring System (NOMS) data.

Annual Model Results and Status of Mitigation Programs

Noise Exposed Population

Table H-11 presents the noise-exposed population by community through 2019. This table includes population within the DNL 60 to 65 dB contours, although a DNL of 65 dB is the federally defined noise criterion used as a guideline to identify when residential land use is considered incompatible with aircraft noise.

Table H-11 Noise-Exposed Population by Community

Year	Census Data	80+ dB	75+ dB	70-75 dB DNL	65-70 dB DNL[1]	Total (65+)	60-65 dB DNL
BOSTON[2]							
1990	1980	0	0	1,778	28,970	30,748	N/A
1992	1980	0	0	800	4,316	5,116	N/A
1993	1980	0	0	264	2,820	3,084	N/A
1994	1990	0	106	265	7,698	8,069	30,895
1995	1990	0	106	851	8,815	9,772	33,765
1996	1990	0	106	374	8,775	9,255	40,992
1997	1990	0	106	719	13,857	14,682	54,804
1998	1990	0	58	580	10,877	11,515	52,201
1999 [3]	1990	0	58	364	11,632	12,054	45,948
2000	2000	0	0	234	9,014	9,248	35,785
2001	2000	0	0	315	6,515	6,700	27,778
2002	2000	0	0	132	2,625	2,757	23,225
2003	2000	0	0	164	1,730	1,894	21,763
2004 [4]	2000	0	65	192	4,142	4,399	24,473
2005 [4]	2000	0	65	104	2,020	2,189	17,661
2006 [4]	2000	0	65	99	1,054	1,218	14,866
2007 [4,5]	2000	0	0	169	4,094	4,263	21,446
2008 [4,5]	2000	0	5	0	3,487	3,492	18,890
2009 [4,5]	2000	0	5	67	937	1,009	12,284
2010 [4,5]	2010	0	0	0	689	689	17,646
2011 [4,5]	2010	0	0	0	331	331	11,600
2012 [4,5]	2010	0	0	0	421	421	11,037
2013 [4,5]	2010	0	0	0	612	612	14,835
2014 [4,5]	2010	0	0	34	4,151	4,185	23,343
2015 [4,5]	2010	0	0	110	7,225	7,365	32,309
2016 [4,5]	2010	0	0	0	4,031	4,031	20,806
2017 [4,5]	2010	0	0	14	4,720	4,734	24,595
2018 [4,5]	2010	0	0	11	2,228	2,239	23,445
2019 [4,5]	2010	0	0	7	4,029	4,036	25,163
CHELSEA							
1990	1980	0	0	0	4,813	4,813	N/A
1992	1980	0	0	0	3,952	3,952	N/A
1993	1980	0	0	0	0	0	N/A
1994	1990	0	0	0	0	0	8,510
1995	1990	0	0	0	95	95	9,750
1996	1990	0	0	0	0	0	8,744
1997	1990	0	0	0	0	0	10,001
1998	1990	0	0	0	0	0	9,222
1999	1990	0	0	0	95	95	9,249
2000	2000	0	0	0	0	0	7,361
2001	2000	0	0	0	0	0	4,508
2002	2000	0	0	0	0	0	3,995
2003	2000	0	0	0	0	0	3,591
2004 [4]	2000	0	0	0	0	0	7,756
2005 [4]	2000	0	0	0	0	0	5,772
2006 [4]	2000	0	0	0	0	0	2,477
2007 [4,5]	2000	0	0	0	0	0	9,774
2008 [4,5]	2000	0	0	0	0	0	7,793

Table H-11	Noise-Exposed Population by Community (Continued)						
Year	Census Data	80+ dB	75+ dB	70-75 dB DNL	65-70 dB DNL[1]	Total (65+)	60-65 dB DNL
CHELSEA							
2009 [4,5]	2000	0	0	0	0	0	5,462
2010 [4,5]	2010	0	0	0	0	0	4,897
2011 [4,5]	2010	0	0	0	0	0	0
2012 [4,5]	2010	0	0	0	0	0	0
2013 [4,5]	2010	0	0	0	0	0	3,485
2014 [4,5]	2010	0	0	0	0	0	9,236
2015 [4,5]	2010	0	0	0	0	0	0
2016 [4,5]	2010	0	0	0	0	0	12,110
2017 [4,5]	2010	0	0	0	65	65	13,900
2018 [4,5]	2010	0	0	0	0	0	10,526
2019 [4,5]	2010	0	0	0	0	0	12,650
EVERETT							
1990	1980	0	0	0	0	0	N/A
1992	1980	0	0	0	0	0	N/A
1993	1980	0	0	0	0	0	N/A
1994	1990	0	0	0	0	0	0
1995	1990	0	0	0	0	0	0
1996	1990	0	0	0	0	0	0
1997	1990	0	0	0	0	0	0
1998	1990	0	0	0	0	0	0
1999	1990	0	0	0	0	0	0
2000	2000	0	0	0	0	0	0
2001	2000	0	0	0	0	0	0
2002	2000	0	0	0	0	0	0
2003	2000	0	0	0	0	0	0
2004 [4]	2000	0	0	0	0	0	0
2005 [4]	2000	0	0	0	0	0	0
2006 [4]	2000	0	0	0	0	0	0
2007 [4,5]	2000	0	0	0	0	0	0
2008 [4,5]	2000	0	0	0	0	0	0
2009 [4,5]	2000	0	0	0	0	0	0
2010 [4,5]	2010	0	0	0	0	0	0
2011 [4,5]	2010	0	0	0	0	0	0
2012 [4,5]	2010	0	0	0	0	0	0
2013 [4,5]	2010	0	0	0	0	0	0
2014 [4,5]	2010	0	0	0	0	0	0
2015 [4,5]	2010	0	0	0	0	0	0
2016 [4,5]	2010	0	0	0	0	0	0
2017 [4,5]	2010	0	0	0	0	0	924
2018 [4,5]	2010	0	0	0	0	0	0
2019 [4,5]	2010	0	0	0	0	0	0
MEDFORD							
1990	1980	0	0	0	0	0	N/A
1992	1980	0	0	0	0	0	N/A
1993	1980	0	0	0	0	0	N/A
1994	1990	0	0	0	0	0	0
1995	1990	0	0	0	0	0	0
1996	1990	0	0	0	0	0	0

Table H-11 Noise-Exposed Population by Community (Continued)

Year	Census Data	80+ dB	75+ dB	70-75 dB DNL	65-70 dB DNL[1]	Total (65+)	60-65 dB DNL
MEDFORD							
1997	1990	0	0	0	0	0	0
1998	1990	0	0	0	0	0	0
1999	1990	0	0	0	0	0	0
2000	2000	0	0	0	0	0	0
2001	2000	0	0	0	0	0	0
2002	2000	0	0	0	0	0	0
2003	2000	0	0	0	0	0	0
2004 [4]	2000	0	0	0	0	0	0
2005 [4]	2000	0	0	0	0	0	0
2006 [4]	2000	0	0	0	0	0	0
2007 [4,5]	2000	0	0	0	0	0	0
2008 [4,5]	2000	0	0	0	0	0	0
2009 [4,5]	2000	0	0	0	0	0	0
2010 [4,5]	2010	0	0	0	0	0	0
2011 [4,5]	2010	0	0	0	0	0	0
2012 [4,5]	2010	0	0	0	0	0	0
2013 [4,5]	2010	0	0	0	0	0	0
2014 [4,5]	2010	0	0	0	0	0	0
2015 [4,5]	2010	0	0	0	0	0	0
2016 [4,5]	2010	0	0	0	0	0	0
2017 [4,5]	2010	0	0	0	0	0	0
2018 [4,5]	2010	0	0	0	0	0	0
2019 [4,5]	2010	0	0	0	0	0	0
QUINCY							
1990	1980	0	0	0	0	0	N/A
1992	1980	0	0	0	0	0	N/A
1993	1980	0	0	0	0	0	N/A
1994	1990	0	0	0	0	0	0
1995	1990	0	0	0	0	0	0
1996	1990	0	0	0	0	0	0
1997	1990	0	0	0	0	0	0
1998	1990	0	0	0	0	0	0
1999	1990	0	0	0	0	0	0
2000	2000	0	0	0	0	0	636
2001	2000	0	0	0	0	0	610
2002	2000	0	0	0	0	0	610
2003	2000	0	0	0	0	0	610
2004 [4]	2000	0	0	0	0	0	610
2005 [4]	2000	0	0	0	0	0	610
2006 [4]	2000	0	0	0	0	0	610
2007 [4,5]	2000	0	0	0	0	0	0
2008 [4,5]	2000	0	0	0	0	0	0
2009 [4,5]	2000	0	0	0	0	0	0
2010 [4,5]	2010	0	0	0	0	0	0
2011 [4,5]	2010	0	0	0	0	0	0
2012 [4,5]	2010	0	0	0	0	0	0
2013 [4,5]	2010	0	0	0	0	0	0
2014 [4,5]	2010	0	0	0	0	0	0

Table H-11 Noise-Exposed Population by Community (Continued)

Year	Census Data	80+ dB	75+ dB	70-75 dB DNL	65-70 dB DNL[1]	Total (65+)	60-65 dB DNL
QUINCY							
2015 [4,5]	2010	0	0	0	0	0	0
2016 [4,5]	2010	0	0	0	0	0	0
2017 [4,5]	2010	0	0	0	0	0	0
2018 [4,5]	2010	0	0	0	0	0	0
2019 [4,5]	2010	0	0	0	0	0	0
REVERE							
1990	1980	0	0	0	4,274	4,274	N/A
1992	1980	0	0	0	3,848	3,848	N/A
1993	1980	0	0	0	4,617	4,617	N/A
1994	1990	0	0	0	3,569	3,569	2,099
1995	1990	0	0	0	3,364	3,364	2,304
1996	1990	0	0	172	3,292	3,464	2,505
1997	1990	0	0	0	3,293	3,293	2,047
1998	1990	0	0	0	3,168	3,168	2,132
1999	1990	0	0	128	3,165	3,293	2,047
2000	2000	0	0	0	2,496	2,496	3,100
2001	2000	0	0	0	2,496	2,496	3,100
2002	2000	0	0	0	2,822	2,822	2,399
2003	2000	0	0	0	2,994	2,994	2,227
2004 [4]	2000	0	0	82	2,969	3,051	2,678
2005 [4]	2000	0	0	82	2,540	2,622	2,731
2006 [4]	2000	0	0	82	2,540	2,622	2,698
2007 [4,5]	2000	0	0	0	2,450	2,450	2,853
2008 [4,5]	2000	0	0	0	2,434	2,434	1,802
2009 [4,5]	2000	0	0	0	2,512	2,512	1,452
2010 [4,5]	2010	0	0	0	2,413	2,413	2,473
2011 [4,5]	2010	0	0	0	2,547	2,547	3,123
2012 [4,5]	2010	0	0	0	2,762	2,762	3,191
2013 [4,5]	2010	0	0	0	2,505	2,505	2,791
2014 [4,5]	2010	0	0	0	2,832	2,832	3,829
2015 [4,5]	2010	0	0	0	3,789	3,789	3,385
2016 [4,5]	2010	0	0	0	2,376	2,376	3,508
2017 [4,5]	2010	0	0	0	2,362	2,362	2,899
2018 [4,5]	2010	0	0	0	2,362	2,362	2,899
2019 [4,5]	2010	0	0	0	3,484	3,484	3,733
WINTHROP							
1990	1980	0	676	1,211	2,420	4,307	N/A
1992	1980	0	626	1,146	2,488	4,262	N/A
1993	1980	0	648	1,211	1,773	3,632	N/A
1994	1990	0	417	1,343	5,154	6,914	7,512
1995	1990	0	482	1,611	5,757	7,850	7,077
1996	1990	0	417	1,376	5,930	7,723	7,333
1997	1990	0	417	1,659	6,386	8,462	6,839
1998	1990	0	519	1,522	6,572	8,613	6,507
1999	1990	0	353	1,408	5,946	7,707	7,135
2000	2000	0	247	1,070	4,684	6,001	7,776
2001	2000	0	244	683	4,123	5,050	8,104
2002	2000	0	2	481	2,247	2,730	7,921

Table H-11 Noise-Exposed Population by Community (Continued)

Year	Census Data	80+ dB	75+ dB	70-75 dB DNL	65-70 dB DNL[1]	Total (65+)	60-65 dB DNL
WINTHROP							
2003	2000	0	0	339	1,956	2,295	7,386
2004 [4]	2000	0	2	337	1,649	1,988	6,508
2005 [4]	2000	0	39	347	1,280	1,666	6,353
2006 [4]	2000	0	39	416	1,288	1,743	6,845
2007 [4,5]	2000	0	0	247	1,139	1,386	6,749
2008 [4,5]	2000	0	0	244	1,409	1,653	6,547
2009 [4,5]	2000	0	0	171	643	814	4,221
2010 [4,5]	2010	0	0	130	598	728	3,720
2011 [4,5]	2010	0	0	130	939	1069	4,303
2012 [4,5]	2010	0	0	200	1,186	1,386	5,305
2013 [4,5]	2010	0	0	130	1,060	1,190	5,466
2014 [4,5]	2010	0	0	130	1,775	1,905	6,456
2015 [4,5]	2010	0	0	320	2,623	2,943	6,375
2016 [4,5]	2010	0	0	130	913	1,403	5,062
2017 [4,5]	2010	0	0	125	647	772	4,656
2018 [4,5]	2010	0	0	51	1,170	1,221	5,586
2019 [4,5]	2010	0	0	96	1,152	1,248	5,621

Table H-11 Noise-Exposed Population by Community (Continued)

Year	Census Data	80+ dB	75+ dB	70-75 dB DNL	65-70 dB DNL[1]	Total (65+)	60-65 dB DNL
All Communities							
1990	1980	0	676	2,989	40,477	44,142	NA
1992	1980	0	628	2,352	14,604	17,584	NA
1993	1980	0	648	1,475	9,210	11,333	NA
1994	1990	0	523	1,608	16,421	18,552	49,016
1995	1990	0	588	2,462	18,031	21,081	52,896
1996	1990	0	523	1,922	17,997	20,442	59,574
1997	1990	0	523	2,378	23,536	26,437	73,691
1998	1990	0	577	2,102	20,617	23,296	70,062
1999[3]	1990	0	411	1,900	20,838	23,149	64,379
2000	2000	0	247	1,304	16,194	17,745	54,190
2001	2000	0	244	998	13,004	14,246	43,616
2002	2000	0	2	613	7,694	8,309	38,150
2003	2000	0	0	503	6,680	7,183	35,577
2004 [4]	2000	0	67	611	8,760	9,438	41,975
2005 [4]	2000	0	104	533	5,840	6,477	33,127
2006 [4]	2000	0	104	597	4,882	5,583	27,496
2007 [4,5]	2000	0	0	416	7,683	8,099	40,822
2008 [4,5]	2000	0	5	244	7,330	7,579	35,122
2009 [4,5]	2000	0	5	238	4,092	4,335	23,419
2010 [4,5]	2010	0	0	130	3,700	3,830	28,736
2011 [4,5]	2010	0	0	130	3,817	3,947	19,026
2012 [4,5]	2010	0	0	200	4,369	4,569	19,533
2013 [4,5]	2010	0	0	130	4,177	4,307	26,577
2014 [4,5]	2010	0	0	164	8,758	8,922	42,864
2015 [4,5]	2010	0	0	430	13,667	14,097	52,748
2016 [4,5]	2010	0	0	130	7,320	7,450	41,486
2017 [4,5]	2010	0	0	139	7,794	7,933	46,974
2018 [4,5]	2010	0	0	62	6,972	7,034	43,270
2019 [4,5]	2010	0	0	103	8,665	8,768	47,167

Source: Data prepared for Massport by HMMH 2020.

Notes: dB – decibel; DNL - Day-Night Average Sound Level; N/A – not available.
South End is included in Boston totals.

1 65 dB DNL is the federally defined noise criterion.

2 Boston includes portions of Dorchester, East Boston, Roxbury, South Boston.

3 Boston population by community changed in 1999 due to employment of more accurate hill effects methodology and reporting change.

4 All results from 2004 to 2015 are from the RealContours™ modeling system with INM.
All results from 2016 to 2019 are from AEDT using the proprietary pre-processor.

5 2018 and 2019 noise analysis uses AEDT version 3c, 2017 used AEDT version 2d, 2016 used AEDT version 2c SP2, 2012 through 2015 used INM version 7.0d, 2011 used INM version 7.0c, 2008 through 2010 used INM version 7.0b, 2007 used INM version 7.01, and 1990 and 2000 used earlier versions of INM.

Cumulative Noise Index (CNI)

Massport reports total annual fleet noise at Logan Airport, defined in the Logan Airport Noise Rules by a metric referred to as the CNI. The CNI is a single number representing the sum of the entire set of single-event noise levels experienced at the Airport over a full year of operation, weighted similarly to DNL so that activity occurring at night is penalized by adding an extra 10 dB to each event. This penalty is mathematically equivalent to multiplying the number of nighttime events by each aircraft by a factor of ten. The Logan Airport Noise Rules define CNI in terms of Effective Perceived Noise Level (EPNL) and require that the index be computed for the fleet of commercial aircraft operating at Logan Airport throughout the year. In addition, in EDRs and ESPRs, Massport reports partial CNI values of noise at Logan Airport, so that various subsets of the fleet (cargo, night operations, passenger jets, etc.) are identified (see **Table H-12**). The Noise Rules, adopted by Massport following public hearings held in February 1986, established a CNI limit of 156.5 EPNdB. The CNI generally has decreased since 1990, remaining below that cap, with changes from year to year on the order of a few tenths of a decibel. The 2018 and 2019 CNI remains well below the cap of 156.5 EPNL.

Table H-12 Cumulative Noise Index (EPNL) – 1990 to 2019 (limit 156.5)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Full CNI (Entire Commercial Jet Fleet)	**156.4**	**155.8**	**155.5**	**155.3**	**155.4**	**155.3**	**155.1**	**154.8**	**154.7**	**154.9**	**154.7**
Total Passenger Jets	155.2	154.8	154.6	154.4	154.4	154.2	154.1	153.9	153.7	153.9	153.6
Total Cargo Jets	150.1	148.9	148.0	147.9	148.3	148.8	148.6	147.5	147.9	148.0	148.2
Total Daytime	152.5	152.1	152.4	152.1	152.1	151.6	151.2	150.8	150.4	150.4	149.5
Total Nighttime	154.4	153.4	152.6	152.4	152.6	152.9	152.9	152.5	152.7	153.1	153.1
Total Stage 2 Jets	N/A	N/A	N/A	N/A	151.0	150.2	149.4	149.2	147.7	147.1	124.7
Total Stage 3 Jets	N/A	N/A	N/A	N/A	153.4	153.8	153.8	153.4	153.8	154.2	154.7
Daytime Stage 2	N/A	N/A	N/A	N/A	149.0	148.5	147.6	146.5	145.2	144.1	122.6
Nighttime Stage 2	N/A	N/A	N/A	N/A	146.7	145.1	144.8	145.8	144.1	144.0	120.5
Daytime Stage 3	N/A	N/A	N/A	N/A	149.1	148.8	148.7	148.8	148.9	149.2	149.5
Nighttime Stage 3	N/A	N/A	N/A	N/A	151.4	152.1	152.2	151.5	152.1	152.5	153.1
Passenger Jet Stage 2	N/A	N/A	N/A	N/A	150.5	149.9	149.2	148.9	147.5	146.8	124.2
Passenger Jet Stage 3	N/A	N/A	N/A	N/A	152.2	152.3	152.3	152.2	152.6	153.0	153.6
Cargo Jet Stage 2	N/A	N/A	N/A	N/A	141.5	137.4	136.8	137.4	139.0	134.5	114.8
Cargo Jet Stage 3	N/A	N/A	N/A	N/A	147.3	148.5	148.3	147.0	147.3	147.9	148.2
Daytime Passenger	N/A	152.0	152.2	152.0	152.0	151.5	151.1	150.6	150.1	150.1	149.3
Nighttime Passenger	N/A	151.6	150.9	150.6	150.8	151.0	151.0	151.1	151.2	151.6	151.6
Daytime Cargo	137.1	137.1	137.6	135.2	136.1	138.0	136.7	136.2	138.0	138.2	137.5
Nighttime Cargo	149.9	148.6	147.6	147.6	148.0	148.4	148.3	147.1	147.5	147.6	147.8
Daytime Passenger Stage 2	N/A	N/A	N/A	N/A	148.9	148.4	147.6	146.5	145.0	143.9	122.3
Daytime Passenger Stage 3	N/A	N/A	N/A	N/A	149.0	148.5	148.4	148.5	148.6	149.0	149.2
Nighttime Passenger Stage 2	N/A	N/A	N/A	N/A	149.0	148.5	148.4	148.5	142.8	143.7	119.8
Nighttime Passenger Stage 3	N/A	N/A	N/A	N/A	149.4	149.9	150.1	149.8	150.5	150.8	151.6
Daytime Cargo Stage 2	N/A	N/A	N/A	N/A	128.3	126.7	124.6	126.4	131.6	131.5	111.1
Daytime Cargo Stage 3	N/A	N/A	N/A	N/A	135.3	137.7	136.4	135.7	136.9	137.1	137.5
Nighttime Cargo Stage 2	N/A	N/A	N/A	N/A	141.3	137.0	136.5	137.0	138.2	131.5	112.3
Nighttime Cargo Stage 3	N/A	N/A	N/A	N/A	147.0	148.1	148.0	146.6	146.9	147.5	147.8

Table H-12 Cumulative Noise Index (EPNL) – 1990 to 2019 (limit 156.5) (Continued)

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Full CNI (Entire Commercial Jet Fleet)	**154.1**	**153.2**	**152.7**	**153.4**	**153.2**	**152.6**	**152.7**	**152.9**	**152.3**	**151.9**	**152.1**
Total Passenger Jets	152.9	151.8	151.3	152.2	152.1	151.4	151.5	151.9	151.1	150.9	150.6
Total Cargo Jets	147.8	147.4	147.1	147.0	146.6	146.5	146.4	146.1	145.9	145.1	146.7
Total Daytime	149.0	148.5	148.0	148.5	148.2	147.5	147.2	147.6	147.1	146.8	146.9
Total Nighttime	152.4	151.3	150.9	151.7	151.6	151.0	151.2	151.4	150.7	150.3	150.6
Total Stage 2 Jets	121.5	114.3	114.1	118.1	N/A	N/A	N/A	N/A	N/A	113.6	110.8
Total Stage 3 Jets	154.1	153.2	152.7	153.4	153.2	152.0	152.7	152.9	152.3	151.9	152.1
Daytime Stage 2	119.3	111.2	113.7	109.4	N/A	N/A	N/A	N/A	N/A	103.6	N/A
Nighttime Stage 2	117.3	111.4	103.2	117.5	N/A	N/A	N/A	N/A	N/A	113.1	110.8
Daytime Stage 3	149.0	148.5	148.0	148.5	148.2	147.5	147.2	147.6	147.1	146.8	146.9
Nighttime Stage 3	152.4	151.3	150.9	151.7	151.6	151.0	151.2	151.4	150.7	150.3	150.6
Passenger Jet Stage 2	116.3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Passenger Jet Stage 3	152.9	151.8	151.3	152.2	152.1	151.4	151.5	151.9	151.1	150.9	150.6
Cargo Jet Stage 2	119.9	114.3	114.1	118.1	NA	NA	NA	NA	NA	113.6	110.8
Cargo Jet Stage 3	147.8	147.4	147.1	147.0	146.6	146.5	146.4	146.1	145.9	145.1	146.7
Daytime Passenger	148.7	148.2	147.7	148.2	147.9	147.2	146.9	147.3	146.8	146.6	146.5
Nighttime Passenger	150.8	149.4	148.8	150.0	150.1	149.3	149.7	150.0	149.1	149.0	148.5
Daytime Cargo	137.1	137.0	136.2	135.7	135.8	135.5	135.8	135.8	135.2	134.5	136.6
Nighttime Cargo	147.4	147.0	146.8	146.7	146.2	146.1	146.0	145.6	145.5	144.7	146.3
Daytime Passenger Stage 2	115.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Daytime Passenger Stage 3	148.7	148.2	147.7	148.2	147.9	147.2	146.9	147.3	146.8	146.6	146.5
Nighttime Passenger Stage 2	110.2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Nighttime Passenger Stage 3	150.8	149.4	148.8	150.0	150.1	149.3	149.7	150,.0	149.1	149.0	148.5
Daytime Cargo Stage 2	117.3	111.2	113.7	109.4	N/A	N/A	N/A	N/A	N/A	103.6	N/A
Daytime Cargo Stage 3	137.0	137.0	136.1	135.7	135.8	135.5	135.8	135.8	135.2	134.4	136.6
Nighttime Cargo Stage 2	116.4	111.4	103.2	117.5	N/A	N/A	N/A	N/A	N/A	113.1	110.8
Nighttime Cargo Stage 3	147.4	147.0	146.8	146.7	146.2	146.1	146.0	145.6	145.5	144.7	146.3

Table H-12 Cumulative Noise Index (EPNL) – 1990 to 2017 (limit 156.5) (Continued)										
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Change 2017 to 2018**	**Change 2018 to 2019**
Full CNI (Entire Commercial Jet Fleet)	**152.2**	**152.3**	**152.9**	**152.7**	**152.6**	**153.1**	**153.4**	**153.5**	**0.3**	**0.1**
Total Passenger Jets	151.3	151.4	151.7	152.0	152.0	152.6	153.0	153.1	0.4	0.1
Total Cargo Jets	144.9	145.1	144.5	144.2	143.8	143.4	142.9	143.0	(0.5)	0.1
Total Daytime	147.0	147.0	147.1	147.2	147.0	147.5	147.6	147.7	0.1	0.1
Total Nighttime	150.6	150.8	151.0	151.2	151.2	151.7	152.1	152.2	0.4	0.1
Total Stage 2 Jets	104.9	111.3	N/A	N/A	N/A	NA	N/A	N/A	N/A	N/A
Total Stage 3 Jets	152.2	152.3	152.5	152.7	152.6	153.1	153.4	153.5	0.3	0.1
Daytime Stage 2	104.9	101.4	N/A	N/A	N/A	NA	N/A	N/A	N/A	N/A
Nighttime Stage 2	N/A	110.8	N/A	N/A	N/A	NA	N/A	N/A	N/A	N/A
Daytime Stage 3	147.0	147.0	147.1	147.2	147.0	147.5	147.6	147.7	0.1	0.1
Nighttime Stage 3	150.6	150.8	151.0	151.2	151.2	151.7	152.1	152.2	0.4	0.1
Passenger Jet Stage 2	104.9	101.4	N/A	N/A	N/A	NA	N/A	N/A	N/A	N/A
Passenger Jet Stage 3	151.3	151.4	151.7	152.0	152.0	152.6	153.0	153.1	0.4	0.1
Cargo Jet Stage 2	N/A	110.8	N/A	N/A	N/A	NA	N/A	N/A	N/A	N/A
Cargo Jet Stage 3	144.9	145.1	144.5	144.2	143.8	143.4	142.9	143.0	(0.5)	0.1
Daytime Passenger	146.8	146.8	146.9	147.0	146.8	147.3	147.5	147.6	0.2	0.1
Nighttime Passenger	149.4	149.6	150.0	150.3	150.4	151.1	151.6	151.7	0.5	0.1
Daytime Cargo	134.0	133.6	134.9	134.4	133.8	133.9	133.6	133.4	(0.3)	(0.2)
Nighttime Cargo	144.5	144.8	144.0	143.7	143.4	142.8	142.3	142.5	(0.5)	0.2
Daytime Passenger Stage 2	104.9	101.4	N/A	N/A	N/A	NA	N/A	N/A	N/A	N/A
Daytime Passenger Stage 3	146.8	146.8	146.9	147.0	146.8	147.3	147.5	147.6	0.2	0.1
Nighttime Passenger Stage 2	N/A	N/A	N/A	N/A	N/A	NA	N/A	N/A	N/A	N/A
Nighttime Passenger Stage 3	149.4	149.6	150.0	150.3	150.4	151.1	151.6	151.7	0.5	0.1
Daytime Cargo Stage 2	N/A	N/A	N/A	N/A	N/A	NA	N/A	N/A	N/A	N/A
Daytime Cargo Stage 3	134.0	133.6	134.9	134.4	133.8	133.9	133.6	133.4	(0.3)	(0.2)
Nighttime Cargo Stage 2	N/A	110.8	N/A	N/A	N/A	NA	N/A	N/A	N/A	N/A
Nighttime Cargo Stage 3	144.5	144.8	144.0	143.7	143.4	142.8	142.3	142.5	(0.5)	0.2

Source: HMMH, 2020.

Notes: CNI – cumulative noise index; EPNL - Effective Perceived Noise Level; N/A – not available.
General aviation (GA) aircraft and non-jet aircraft are not included in the calculations. Negative numbers are shown in parentheses ( ).

Residential Sound Insulation Program (RSIP)

In 2018 and 2019, no new dwelling units received sound insulation from Massport, with a total of 5,467 residential buildings and 11,515 dwelling units that have been sound insulated since 1986 when the program was first implemented. **Table H-13** lists the yearly progress of this mitigation effort.

Following FAA's approval of model adjustments based on the effects of terrain (discussed in the *1999 ESPR*), Massport submitted, and the New England Region of FAA approved, a new sound insulation program. The revised contour, approved for a two-year period beginning in 1999, included dwelling units in East Boston, South Boston, and Winthrop that previously had not been eligible for insulation. Massport received notice of FAA funding for $5 million. Subsequently, Massport updated its program contour, first with the *2001 EDR* contour and more recently with the Logan Airside Improvements Project approved contour. These updates allowed Massport to continue the program with yearly additional funds through 2014.

The Logan Airside Improvements Project incorporated runway use changes due to the new Runway 14-32 which opened in late November 2006. The Logan Airside Improvements Project update expanded the focus of the sound insulation program into Chelsea to satisfy the mitigation commitments made in the Airside Improvements Program Record of Decision (ROD). Massport also utilized a program where they have contacted property owners that are still eligible within the RSIP boundaries that had previously declined to participate. Owners have been offered a second chance to participate in the program.

As of 2015, the FAA requires airports to use the AEDT model to establish eligibility for sound insulation; therefore, Massport has submitted an AEDT-derived noise exposure map to be kept on file with the FAA. The FAA requires that a submitted sound insulation program contour should represent current operational conditions; generally, the contour year should match the date of the document submittal. Massport developed a 2019 Noise Exposure Map (NEM) contour (including block rounding) representing pre-COVID conditions to comply with this requirement and submitted it to FAA in the summer of 2020. Once accepted by the FAA, Massport will reach out to eligible homeowners to discuss potential mitigation options for their homes.

In January 2020, Massport's CEO sent a letter to the FAA Associate Administrator requesting that Massport and the FAA work together to address re-treatment of homes that were sound insulated during the early years of the program to upgrade eligible homes to newer more effective and durable materials (**Figure H-13**). The Associate Administrator responded that the FAA is exploring limited circumstances under which Massport might be able to mitigate homes that had been mitigated before the FAA first issued sound insulation standards in 1993 (**Figure H-14**). The status of the initiative will be reported in future EDRs.

Table H-13 Residential Sound Insulation Program (RSIP) Status (1986-2019)		
Construction Year	**Residential Buildings[1]**	**Dwelling Units[2]**
1986	4	8
1987	43	51
1988	102	159
1989	94	133
1990	121	200
1991	175	360
1992	197	354
1993	318	654
1994	310	542
1995	372	753
1996	323	577
1997	364	808
1998	328	806
1999	330	718
2000	195	601
2001	260	278
2002	205	354
2003	230	468
2004	320	791
2005	314	471
2006	286	827
2007	160	548
2008	94	388
2009	111	287
2010	56	83
2011	62	114
2012[3]	0	0
2013	45	76
2014	48	106
2015	0	0
2016	0	0
2017	0	0
2018	0	0
2019	0	0
Total	**5,467**	**11,515**

Source: Massport, 2020.
1 Includes multiple units.
2 Individual units.
3 Federal funding was delayed in 2012.

Table H-14 provides a list of all schools that have been treated under Massport's sound insulation program. To date, Massport has provided sound insulation to 36 schools at a cost of over $8 million.

Table H-14 Schools Treated Under Massport Sound Insulation Program

Boston:	
East Boston	**Winthrop**
East Boston High	Winthrop Jr. High School
St. Mary's Star of the Sea	E. B. Newton
St. Dominic Savio High	A. T. Cummings (Ctr.) School
St. Lazarus	*3 Winthrop Schools*
James Otis	
Samuel Adams	
Curtis Guild	**Revere**
Dante Alighieri	Beachmont School
P.J. Kennedy	*1 Revere School*
Donald McKay	
Hugh Roe O'Donnell	
E Boston Central Catholic	**Chelsea**
Manassah Bradley	Shurtleff School
13 East Boston Schools	Williams School
	St. Rose Elementary
South Boston	St. Stanislaus
St. Augustine	Chelsea High School
Cardinal Cushing	*5 Chelsea Schools*
Patrick Gavin	
St. Bridgid's	**36 Total Schools**
Oliver Hazard Perry	
Condon School	
6 South Boston Schools	
Roxbury and Dorchester	
Samuel Mason	
Dearborn Middle	
Ralph Waldo Emerson	
Lewis Middle	
Nathan Hale Elem.	
Phillis Wheatley Elem.	
Davis Ellis Elem.	
Henry L. Higginson	
8 Roxbury and Dorchester Schools	
27 Total Boston Schools	

Source: Massport, 2015.

Figure H-13 Massport Residential Sound Treatment Request

Massachusetts Port Authority
Lisa S. Wieland, Chief Executive Officer
One Harborside Drive, Suite 200S
East Boston, MA 02128-2090
Telephone (617) 568-1003
www.massport.com

January 28, 2020

D. Kirk Shaffer
Associate Administrator for Airports
Federal Aviation Administration
Office of the Associate Administrator for Airports (ARP)
800 Independence Avenue SW
Washington, D.C. 20591

Subject: Residential Sound Treatment and Old Window Technology

Dear Associate Administrator Shaffer:

The Massachusetts Port Authority (Massport) and the FAA have a strong, historic partnership implementing one of the most successful airport noise mitigation sound treatment programs in the nation. Since 1984, when Massport and the FAA first collaborated on testing noise mitigation strategies for homes, we have sound insulated over 11,000 dwellings and 36 schools in 7 communities most affected by aircraft noise. I am writing today to formally request that our two agencies work together to address the first generation treatments (dating from 1984 to 1993) located in our highest noise-impacted communities.

Boston Logan International Airport has been experiencing tremendous growth due to a strong economy and a vibrant airline industry. Over the past five years, traffic at Logan has increased by over 10 million passengers. This level of growth requires Massport, with support from the FAA and our airline partners, to invest in new infrastructure at Logan Airport. A critical part of our success in proposing and implementing key projects at an urban airport in close proximity to residential communities is our ability to address aircraft noise and air emissions impacts.

One area of community engagement around noise impacts has been the re-treatment of homes that were sound insulated during the early years of the residential soundproofing program. The composite structures and materials that were used then are no longer in use. The structures and materials used in window and door treatments today are more effective and durable.

The FAA's current policy does not allow the re-treatment of homes that were previously sound insulated under the program. I respectfully request that the FAA revisit this policy for those homes that were treated between 1984 and 1993 with the old technology and continue to fall within the latest 65 DNL contour. This request targets a narrow set of eligible homes with the highest noise exposure and whose owners have not been able to update their structures to take advantage of the vast improvements in the efficiency and effectiveness of window and door treatments.

I look forward to further discussions with you on this critical community engagement effort.

Sincerely,

Lisa S. Wieland

Lisa S. Wieland
Chief Executive Officer

cc: Winsome Lenfert, (FAA), Gail Latrell (FAA), Ed Freni, Flavio Leo, Senator Edward Markey, Senator Elizabeth Warren, Congresswoman Katherine Clark, Congresswoman Ayanna Pressley

Operating | Boston Logan International Airport • Worcester Regional Airport • Hanscom Field • Conley Container Terminal • Flynn Boston • Boston Fish Pier

Figure H-14 FAA Response to Massport Residential Sound Treatment Request

U.S. Department of Transportation
Federal Aviation Administration

Office of the Associate Administrator for Airports

800 Independence Ave, SW.
Washington, DC 20591

MAR 1 1 2020

Ms. Lisa S. Wieland
Chief Executive Officer
Massachusetts Port Authority
One Harborside Drive, Suite 200S
East Boston, MA 02128

Dear Ms. Wieland:

Thank you for your January 28 letter concerning the Massachusetts Port Authority's (Massport) Residential Sound Insulation Program associated with General Edward Lawrence Logan International Airport (BOS). Specifically, you asked the Federal Aviation Administration (FAA) to reconsider the possibilities of Airport Improvement Program (AIP) funding for noise mitigation for homes that had been sound insulated between 1985 and 1993.

It is my understanding that my staff and Massport representatives discussed this request on February 20 and that this discussion included a potential path forward that may allow us to revisit our previous conclusions for a narrow set of homes insulated prior to 1993.

We are exploring limited circumstances under which Massport might be able to mitigate homes that had been mitigated before the FAA first issued sound insulation standards in 1993. We believe those homes could be considered unmitigated because of the uncertainty of whether the doors, windows, and other insulation installed would have achieved sufficient interior noise reduction as those manufactured and installed consistent with FAA standards. The FAA does not consider the aging of treatments or homes, depreciation, or the passage of time as factors for eligibility.

In addition to the pre-1993 time period, Massport would have to verify that the homes potentially eligible for mitigation remain inside the day/night average sound level 65 decibel (dB) contour, have an interior noise level greater than 45 dB (established through current interior noise measuring protocols), and otherwise meet current AIP eligibility requirements and FAA standards.

Finally, AIP funds for sound insulation are limited, and an eligibility finding does not guarantee funding.

Figure H-14 FAA Response to Massport Residential Sound Treatment Request (Continued)

2

My staff will contact your staff to schedule additional meetings to continue these discussions. In the meantime, if you require further assistance, please contact the New England Regional Airports Division at (781) 238-7600.

I trust this information is helpful.

Sincerely,

D. Kirk Shaffer
Associate Administrator
for Airports

Noise Complaints

Table H-15 presents a detailed list by community of the total noise complaints made in 2017, 2018, and 2019, which can be filed either on Massport's Noise Complaint Line, through a form on Massport's website, or through the PublicVue flight track portal. The Noise Complaint Line provides individuals the ability to express their concerns about aviation noise (activities) or to ask questions regarding noise at Logan Airport. Callers ask a range of questions such as "Why is this runway in use?"; "What times do the planes stop flying?"; and "Was that aircraft off-course?"

The Noise Abatement Office (NAO) staff documents noise line complaints by obtaining information from the caller about the nature of the complaint, time of the occurrence, location of caller's residence, and the activity that was disturbed. The NAO uses the collected information to determine the probable activity responsible for the complaint and writes a letter report to the complainant. The letter includes the original complaint, a response that identifies the activity responsible for the call (arrivals, departures, run-up, etc.), meteorological information at the time of the call (a major factor in aviation activities), runways in use at the time of the call, and a notice that FAA will receive a copy of the report.

In 2018, Massport received 71,381 noise complaints from 82 communities, an increase from 59,343 noise complaints from 95 communities in 2017. In 2019, the number of complaint calls rose to 268,929 from 86 communities. The number of individual complainants decreased from 4,269 callers in 2017 to 2,178 callers in 2018, and then increased again to 2,669 callers in 2019. The increase in complaints from 2017 to 2018 was 20 percent, but the decrease in number of individual callers was almost 49 percent. From 2018 to 2019 the number of complaints rose 277 percent while the number of individual callers rose 23 percent.

Recent technological advances in both Massport's noise complaint phone system and online complaint tracking system, as well as the incorporation of third-party complaint applications, have made it easier for community members to file a complaint and to receive information about particular noise events. In late 2018, Massport added the option to submit complaints through the Airnoise button[19] which has dramatically increased complaints logged in the system. In 2017, the average number of complaints per individual caller (the ratio of calls to callers) was 13.9. This ratio increased to an average 32.8 complaints per caller throughout 2018 and then to an average 100.8 complaints per caller in 2019.

Figure H-15 shows the call and callers data graphically. Massport's website, http://www.massport.com/logan-airport/about-logan/noise-abatement/complaints/), provides for additional general questions and answers regarding the Noise Complaint Line.

19 Airnoise is a subscription service that allows the user to file a noise complaint by clicking a button. The system finds the aircraft closest to the complainer and then files a detailed noise complaint directly with Massport. https://www.airnoise.io/

Table H-15 Noise Complaint Line Summary

	2017		2018		2019		Change in number of calls, 2017 to 2018	Change in number of calls, 2018 to 2019
Town Name	Calls	Callers	Calls	Callers	Calls	Callers		
Acton	2	2	0	0	0	0	(2)	0
Andover	4	2	1	1	0	0	(3)	(1)
Arlington	2,252	137	1,264	50	7,021	77	(988)	5,757
Belmont	1,129	102	698	43	1,132	41	(431)	434
Beverly	15	4	62	4	13	6	47	(49)
Billerica	8	5	2	1	2	2	(6)	0
Bolton	0	0	0	0	1	1	0	1
Boston	186	59	23	17	162	27	(163)	139
Boxford	0	0	0	0	10	4	0	10
Braintree	29	4	28	6	126	5	(1)	98
Brewster	1	1	0	0	0	0	(1)	0
Brighton	2	2	2	2	0	0	0	(2)
Brockton	0	0	5	2	8	2	5	3
Brookline	4	3	6	4	2	2	2	(4)
Burlington	22	14	4	3	0	0	(18)	(4)
Cambridge	1,657	211	1,118	131	1,958	142	(539)	840
Canton	19	7	6	2	5	2	(13)	(1)
Carlisle	3	1	0	0	0	0	(3)	0
Charlestown	31	16	24	12	65	14	(7)	41
Chelmsford	1	1	501	1	1,931	2	500	1,430
Chelsea	428	117	237	58	1,605	47	(191)	1,368
Cohasset	214	13	685	9	975	9	471	290
Danvers	0	0	21	4	2	2	21	(19)
Dedham	4	3	12	6	2	2	8	(10)
Dorchester	519	60	52	16	28	15	(467)	(24)
Dover	10	3	4	3	8	1	(6)	4
Dunstable	3	1	0	0	0	0	(3)	0
Duxbury	1	1	0	0	287	2	(1)	287
East Boston	312	97	148	56	3,803	70	(164)	3,655
East Bridgewater	0	0	2	1	0	0	2	(2)
Easton	1	1	0	0	0	0	(1)	0
Essex	0	0	1	1	4	2	1	3
Everett	335	118	9	5	58	23	(326)	49
Framingham	2	2	8	2	8	1	6	0
Gloucester	10	2	3	2	2	2	(7)	(1)
Groton	88	1	2	1	7	2	(86)	5
Groveland	1	1	0	0	0	0	(1)	0
Hamilton	53	22	61	12	187	11	8	126

Table H-15 Noise Complaint Line Summary (Continued)

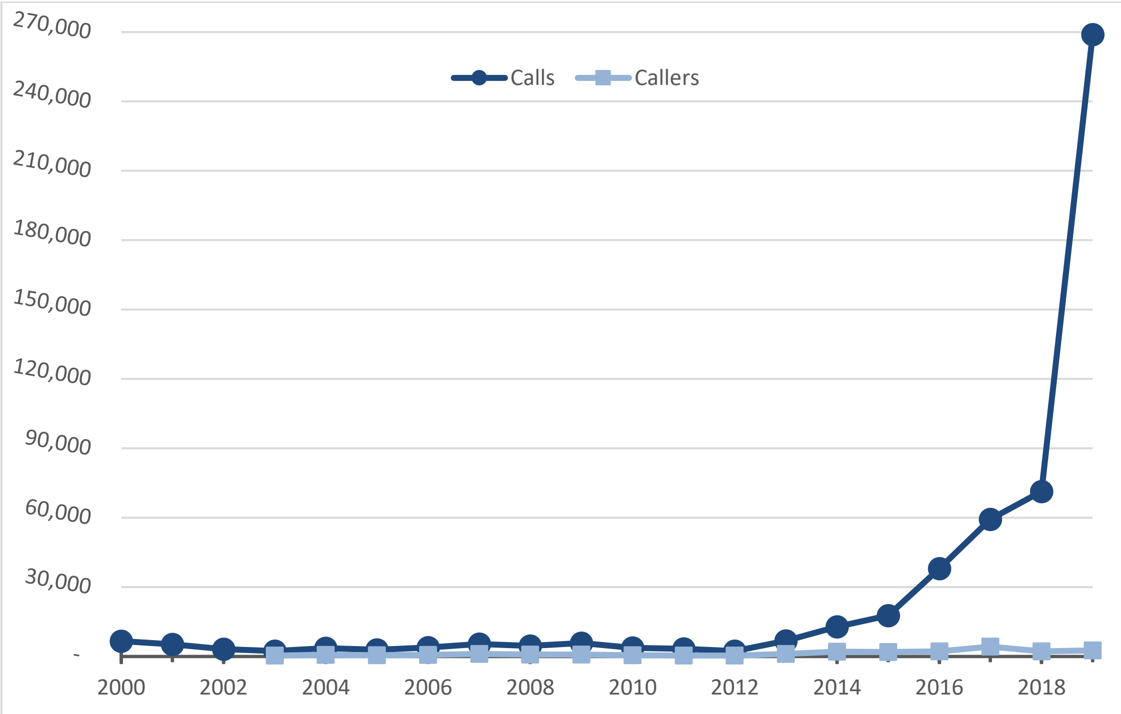
Town Name	2017 Calls	2017 Callers	2018 Calls	2018 Callers	2019 Calls	2019 Callers	Change in number of calls, 2017 to 2018	Change in number of calls, 2018 to 2019
Hanover	3	2	2	2	0	0	(1)	(2)
Hingham	67	27	14	7	15	6	(53)	1
Holbrook	10	2	6	4	1	1	(4)	(5)
Hopkinton	0	0	1	1	0	0	1	(1)
Hull	1,500	175	1,024	101	1,047	97	(476)	23
Hyde Park	132	20	1,308	9	1,514	11	1,176	206
Ipswich	104	28	71	9	139	8	(33)	68
Jamaica Plain	2,016	274	8,395	111	17,132	108	6,379	8,737
Lexington	0	0	0	0	1	1	0	1
Lincoln	114	1	0	0	0	0	(114)	0
Lowell	1	1	0	0	0	0	(1)	0
Lynn	276	10	206	18	60	21	(70)	(146)
Lynnfield	1	1	0	0	2	1	(1)	2
Malden	1,987	96	823	36	15,414	34	(1,164)	14,591
Manchester	1	1	2	2	0	0	1	(2)
Marblehead	18	4	70	3	1,291	14	52	1,221
Marshfield	13	6	14	5	5	4	1	(9)
Mattapan	4	2	1	1	1	1	(3)	0
Medfield	1	1	0	0	2	2	(1)	2
Medford	7,856	745	5,857	328	98,021	712	(1,999)	92,164
Melrose	5	2	7	1	1,967	4	2	1,960
Middleton	4	2	12	6	5	2	8	(7)
Millis	132	1	63	1	12	1	(69)	(51)
Milton	23,940	486	34,902	314	41,575	219	10,962	6,673
Nahant	117	18	59	16	73	20	(58)	14
Natick	1	1	0	0	2	1	(1)	2
Needham	36	8	22	1	9	3	(14)	(13)
Newington	0	0	0	0	5	1	0	5
Newton	319	25	152	17	208	18	(167)	56
North Easton	0	0	3	2	0	0	3	(3)
North Reading	0	0	1	1	0	0	1	(1)
Norton	0	0	0	0	2	2	0	2
Norwell	7	4	2	2	2	1	(5)	0
Norwood	1	1	1	1	2	1	0	1
Peabody	61	6	58	11	29	10	(3)	(29)
Pembroke	5	1	0	0	3	1	(5)	3
Quincy	44	33	22	15	7	6	(22)	(15)
Randolph	3	2	9	2	3	3	6	(6)

Table H-15 Noise Complaint Line Summary (Continued)

	2017		2018		2019			
Town Name	Calls	Callers	Calls	Callers	Calls	Callers	Change in number of calls, 2017 to 2018	Change in number of calls, 2018 to 2019
Reading	13	9	0	0	1	1	(13)	1
Revere	134	47	164	52	291	95	30	127
Roslindale	2,094	203	1,289	101	2,975	78	(805)	1,686
Roxbury	891	36	990	13	5,151	24	99	4,161
Salem	6	3	23	8	82	16	17	59
Saugus	4	2	28	2	1	1	24	(27)
Scituate	8	6	901	5	946	5	893	45
Sharon	3	3	1	1	56	2	(2)	55
Shirley	1	1	0	0	0	0	(1)	0
Somerville	3,762	309	2,565	150	28,070	229	(1,197)	25,505
South Boston	1,792	78	605	36	448	48	(1,187)	(157)
South End	786	135	1,724	43	5,309	27	938	3,585
Stoneham	2	2	3	3	3	3	1	0
Stoughton	21	3	9	1	65	1	(12)	56
Sudbury	105	1	26	1	21	2	(79)	(5)
Swampscott	4	3	11	9	8	6	7	(3)
Topsfield	2	2	0	0	33	2	(2)	33
Waban	1	1	0	0	0	0	(1)	0
Wakefield	47	7	26	3	23	2	(21)	(3)
Waltham	6	5	0	0	3	3	(6)	3
Watertown	818	65	250	28	3,709	28	(568)	3,459
Wellesley	1	1	0	0	0	0	(1)	0
Wenham	116	11	377	6	537	5	261	160
West Roxbury	1,104	56	2,358	23	5,239	27	1,254	2,881
Westwood	157	3	223	4	192	2	66	(31)
Weymouth	92	5	130	12	152	7	38	22
Whitman	2	1	0	0	0	0	(2)	0
Wilmington	3	3	1	1	2	1	(2)	1
Winchester	895	111	936	16	9,143	15	41	8,207
Winthrop	293	128	611	171	8,121	201	318	7,510
Woburn	55	30	34	7	387	8	(21)	353
Total	**59,343**	**4,269**	**71,381**	**2,178**	**268,929**	**2,669**	12,038	197,548

Source: Massport, HMMH 2020.
Note: Negative numbers are shown in parentheses ( ).

Figure H-15 Noise Complaint Line Calls and Callers by Year



Source: Massport and HMMH, 2020

AEDT Correspondence

Massport engaged in an extensive process with FAA New England Region and the FAA Office of Environment and Energy (AEE-100) upon the release of AEDT. This process was to develop and gain concurrence on the use of Logan Airport specific modifications to the AEDT model and inputs. Meetings and discussion were held in 2016 and 2017 to determine what adjustments Massport could make to the AEDT model to account for Logan Airport's unique terrain. The complete set of correspondence which determined the AEDT adjustments for the 2016 DNL contours is provided in the *2016 EDR Appendix H*.

In August 2017, the FAA expressed concurrence, in principal, with two of Massport's four requested adjustments; that response letter is included in the *2017 ESPR Appendix H*. For the 2018 and 2019 noise modeling, Massport applied the two allowed adjustments, using the same methodology as 2016 and 2017, however for the stagelength modifications, Massport utilized the new alternate weight profiles for AEDT types that had available profiles in AEDT 3c.

Flight Track Monitoring Report

As part of its ongoing commitment to mitigate noise at Logan Airport, Massport has undertaken evaluating the flight tracks of turbojet aircraft engaged in the implementation of established FAA noise abatement procedures. As is true for any airport operator, however, Massport has no authority to control where individual aircraft fly. That remains the responsibility of FAA, while the individual pilots are responsible for safely executing FAA's instructions. The flight procedures, which are used by the Air Traffic Control (ATC) staff at Boston Tower to achieve desired noise abatement tracks, are contained in FAA's Tower Order (BOS TWR 7040.1).

Since 2002, Massport has prepared annual reports for flight track monitoring. Prior to 2002, Massport had issued semi-annual reports, an outgrowth of the Flight Track Monitoring Program study. That study was contained in the *Generic Environmental Impact Report* filed with Massachusetts Environmental Policy Act (MEPA) in July 1996 and was the subject of two Community Working Group workshops in September and October 1996. The annual flight track monitoring reports are published in Appendix H, *Noise Abatement* in the annual EDR or ESPR. The information for 2017 is repeated in this report for reference. The period covered by this *2018/2019 EDR* is January 1, 2018 through December 31, 2019, with each calendar year tabulated separately.

The purpose of the ongoing monitoring program is to identify any systematic changes in flight tracks that may occur and to reduce flight track dispersion, where appropriate. The next report will cover the period January 1, 2020 through December 31, 2020 and will be included in the next EDR.

FAA Air Traffic Control (ATC) Procedures

FAA Tower Order BOS TWR 7040.1 entitled "Noise Abatement" describes the series of noise abatement policies, rules, regulations, and the procedures to be followed by FAA air traffic controllers in meeting their designated responsibilities to be "a good neighbor, while meeting our operational objectives/ responsibilities to the National Airspace System." Section 7.a.3 of the Order, subtitled "Turbojet Departure Noise Abatement Procedures," states that all turbojet departures shall be issued the Standard Instrument Departure (SID) procedure appropriate for the departure runway. Logan Airport has ten published SIDs; nine area navigation (RNAV) SIDs and one conventional SID.

The conventional SID is for aircraft that are not equipped to fly RNAV procedures. The conventional SID uses terms such as "BOS 2 DME" to indicate where aircraft should turn. Here, BOS refers to an aid to navigation known as the BOSTON VORTAC, a radio beacon physically located on Logan Airport near the eastern shoreline between the ends of Runways 27 and 33L (indicated by a circle on **Figure H-16**). DME refers to "Distance Measuring Equipment," a co-located aid to navigation that provides pilots with a cockpit display of the number of nautical miles that the aircraft is from the designated radio beacon. Thus, BOS 2 DME means an aircraft should be two nautical miles away from the BOS. Pilots are then "vectored" or assigned to fly a magnetic heading given by and at the discretion of FAA air traffic controller to maintain the safe separation of aircraft. All altitudes in feet listed below (unless otherwise noted) are in mean sea level (MSL) and indicate the aircraft altitude used both by the pilot in the cockpit and the air traffic controller on the ground.

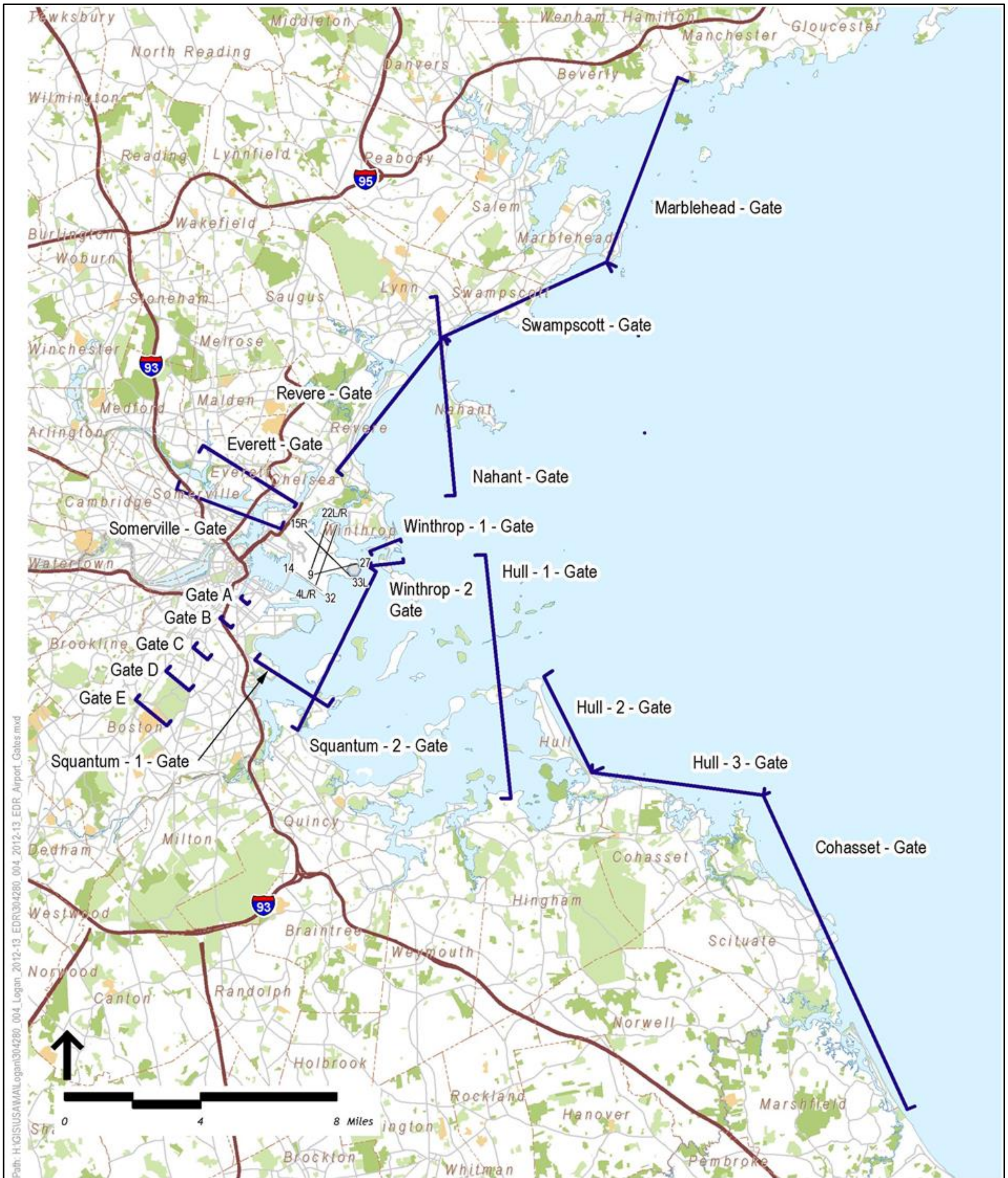
During 2010, several of the conventional-only (or radar vector) and RNAV procedures from the *Boston Logan Airport Noise Study Categorical Exclusion* (CATEX)[20] were implemented. There are eight RNAV procedures for departures from Logan Airport. These eight procedures are used by aircraft departing Runways 4R, 9, 15R, 22L, 22R, 27, and 33L (Runways 27 and 33L were added in 2014). These procedures primarily affected departures flying over the North and South shores and were designed to increase the amount of jet traffic crossing back over land above 6,000 feet to minimize noise impacts to communities. A ninth RNAV procedure, which is used by Runway 27, has been modified several times.

Figure H-16 presents the gates used in the analysis for the Flight Track Monitoring Report. These gates are virtual vertical planes, which are used in the analysis to capture the aircraft flight paths. The gates are defined using geographic coordinates for each end of the gate, along with a floor and a ceiling altitude. The gates also capture direction of flights (in or out). The edges of each gate in **Figure H-16** point in the direction that the aircraft is coming from. This information is used to evaluate the performance of the flight procedures off each runway end and is presented below.

The RNAV procedures are still captured by the original flight track monitoring gates. Traffic crossing over the North Shore passes through the Marblehead, Swampscott and Revere Gates and traffic passing over the South Shore passes through the Hull 2, Hull 3, and Cohasset Gates. Turbojets departing Runway 27 on the RNAV pass through the Runway 27 gates and the Runway 33L RNAV flight tracks still pass between the Somerville and Everett gates as expected. The following pages examine the jet aircraft gate crossing data by departure runway.

20 Federal Aviation Administration (FAA) *Boston Logan Airport Noise Study Categorical Exclusion Record of Decision* (CATEX ROD), Issued October 16, 2007.

Figure H-16 Logan Airport Flight Track Monitor Gates



Source: HMMH, MassGIS, USDA NAIP 2010

Logan Airport Flight Track Monitor Gates

Logan Flight Gates

Boston VOR/DME

Figure H-16

Statistical Analyses of Flight Tracks - Runway 4R

The Nahant Gate (**Figure H-16**) monitors aircraft after the first turn at 4 DME. The Swampscott and Marblehead Gates monitor northbound shoreline crossings, while the Hull 2, Hull 3, and Cohasset Gates monitor southbound shoreline crossings.

Tables H-16a, H-16b, and H-16c show that Runway 4R departures for 2017, 2018 and 2019 were consistently concentrated with 99.5 percent "over the Causeway," about 0.1 or 0.2 percent over the south end of the gate, and about 0.4 or 0.5 percent over the north end of the gate.

Table H-16a Runway 4R Nahant Gate Summary for 2017

	Number of Tracks Through Gate Segment	Percentage of Tracks Through Gate Segment
North End of Gate	18	0.5%
Over Causeway	3,798	99.5%
South End of Gate	3	0.1%
Total	**3,819**	**100.0%**

Source: Massport, HMMH 2018.

Table H-16b Runway 4R Nahant Gate Summary for 2018

	Number of Tracks Through Gate Segment	Percentage of Tracks Through Gate Segment
North End of Gate	34	0.5%
Over Causeway	7,332	99.5%
South End of Gate	16	0.2%
Total	**7,382**	**100.0%**

Source: Massport, HMMH 2020.

Table H-16c Runway 4R Nahant Gate Summary for 2019

	Number of Tracks Through Gate Segment	Percentage of Tracks Through Gate Segment
North End of Gate	25	0.4%
Over Causeway	6,794	99.5%
South End of Gate	7	0.1%
Total	**6,826**	**100.0%**

Source: Massport, HMMH 2020.

Tables H-17a, H-17b, and **H-17c** show how many of the shoreline crossings following departure from Runway 4R were above 6,000 feet. For 2017, 96.1 percent of the flights were above 6,000 feet compared to 97.0 percent in 2018 and 94.5 percent in 2019. The Swampscott gate had the lowest percent of flights above 6,000 feet in all three years, with only 16.9 percent in 2017, 19.7 percent in 2018, and 13.3 percent in 2019. The crossing percentage meeting the altitude stipulation for this gate is historically lower than for the other shoreline gates due to its proximity to the Airport. As seen in **Figure H-16**, the Swampscott gate is adjacent to the Nahant gate and aircraft would therefore have to climb very quickly to be above 6,000 feet when crossing the gate. Less than 5 percent of Runway 4R departures in any given year cross the shoreline at the Swampscott gate.

Table H-17a Runway 4R Shoreline Crossings Above 6,000 Feet for 2017

	Number of Tracks Through Gate	Number Above 6,000 ft	Percentage Above 6,000 ft
Swampscott Gate	83	14	16.9%
Marblehead Gate	1,538	1,509	98.1%
Hull 2 Gate	160	160	100.0%
Hull 3 Gate	608	07	99.8%
Cohasset Gate	124	124	100.0%
Total	**2,513**	**2,414**	**96.1%**

Source: Massport, HMMH 2018.

Table H-17b Runway 4R Shoreline Crossings Above 6,000 Feet for 2018

	Number of Tracks Through Gate	Number Above 6,000 ft	Percentage Above 6,000 ft
Swampscott Gate	122	24	19.7%
Marblehead Gate	2,919	2,872	98.4%
Hull 2 Gate	358	358	100.0%
Hull 3 Gate	1,153	1,152	99.9%
Cohasset Gate	335	335	100.0%
Total	**4,887**	**4,741**	**97.0%**

Source: Massport, HMMH 2020.

Table H-17c Runway 4R Shoreline Crossings Above 6,000 Feet for 2019

	Number of Tracks Through Gate	Number Above 6,000 ft	Percentage Above 6,000 ft
Swampscott Gate	211	28	13.3%
Marblehead Gate	2,716	2,652	97.6%
Hull 2 Gate	355	355	100.0%
Hull 3 Gate	865	865	100.0%
Cohasset Gate	347	346	99.7%
Total	**4,494**	**4,246**	**94.5%**

Source: Massport, HMMH 2020.

Statistical Analyses of Flight Tracks - Runway 9

The Winthrop 1 and Winthrop 2 gates (**Figure H-16**) monitor early turns for departures off Runway 9. The Revere, Swampscott, or Marblehead gates monitor northbound shoreline crossings, while the Hull 2, Hull 3, or Cohasset gates monitor southbound shoreline crossings.

Tables H-18a, **H-18b,** and **H-18c** show how many tracks turned prior to the BOS 2 DME. Northbound turns before BOS 2 DME pass through the Winthrop 1 Gate. Southbound traffic would pass through the Winthrop 2 Gate. In 2017, there were a total of 65 such turns and in 2018 and 2019, 42 and 79 tracks crossed these gates respectively. The compliance rate for avoiding the early turns was 99.8 percent in 2017 and 99.9 percent in both 2018 and 2019.

Table H-18a Runway 9 Gate Summary — Winthrop Gates 1 and 2 for 2017

	Number of Tracks Through Gate	Percent Turning Before BOS 2 DME
Winthrop 1 Gate	37	0.1%
Winthrop 2 Gate	28	0.1%
Neither gate	43,771	99.8%
Total	**43,836**	**100%**

Source: Massport, HMMH 2018.
Note: DME – distance measuring equipment.

Table H-18b Runway 9 Gate Summary — Winthrop Gates 1 and 2 for 2018

	Number of Tracks Through Gate	Percent Turning Before BOS 2 DME
Winthrop 1 Gate	26	<0.1%
Winthrop 2 Gate	16	<0.1%
Neither gate	54,692	99.9%
Total	**54,734**	**100 %**

Source: Massport, HMMH 2020.

Table H-18c Runway 9 Gate Summary — Winthrop Gates 1 and 2 for 2019

	Number of Tracks Through Gate	Percent Turning Before BOS 2 DME
Winthrop 1 Gate	66	0.1%
Winthrop 2 Gate	13	0.0%
Neither gate	56,179	99.9%
Total	**56,258**	**100%**

Source: Massport, HMMH 2020.

Tables H-19a, H-19b, and **H-19c** indicate that 99.4 percent of Runway 9 departures were above 6,000 feet when crossing the shoreline in 2018 and 99.9 in 2019, compared with 99.5 percent in 2017. In any given year, approximately 65 percent of aircraft departing Runway 9 that cross back over the shoreline do so over the South Shore, as opposed to about 35 percent over the North Shore.

The percentages above 6,000 feet remained fairly constant from 2017 to 2019, with the exception of the Revere gate. The percentage above 6,000 feet fell from 72.7 percent in 2017 to 66.7 percent in 2018 and then to 13.0 percent in 2019. The number of flights through the Revere gate more than tripled from 33 in 2017 to 115 in 2019.

Table H-19a Runway 9 Shoreline Crossings Above 6,000 Feet for 2017

	Number of Tracks Through Gate	Number Above 6,000 ft	Percentage Above 6,000 ft
Revere Gate	33	24	72.7%
Swampscott Gate	470	435	92.6%
Marblehead Gate	10,645	10,628	99.8%
Hull 2 Gate	1,656	1,648	99.5%
Hull 3 Gate	3,393	3,327	98.1%
Cohasset Gate	15,441	15,427	99.9%
Total	**31,638**	**31,489**	**99.5%**

Source: Massport, HMMH 2018.

Table H-19b Runway 9 Shoreline Crossings Above 6,000 Feet for 2018

	Number of Tracks Through Gate	Number Above 6,000 ft	Percentage Above 6,000 ft
Revere Gate	51	34	66.7%
Swampscott Gate	638	586	91.8%
Marblehead Gate	13,862	13,828	99.8%
Hull 2 Gate	2,215	2,211	99.8%
Hull 3 Gate	4,584	4,477	97.7%
Cohasset Gate	19,092	19,083	100.0%
Total	**40,442**	**40,219**	**99.4%**

Source: Massport, HMMH 2020.

Table H-19c Runway 9 Shoreline Crossings Above 6,000 Feet for 2019

	Number of Tracks Through Gate	Number Above 6,000 ft	Percentage Above 6,000 ft
Revere Gate	115	15	13.0%
Swampscott Gate	1,245	1,116	89.6%
Marblehead Gate	13,318	13,268	99.6%
Hull 2 Gate	2,836	2,824	99.6%
Hull 3 Gate	5,698	5,586	98.0%
Cohasset Gate	18,089	18,065	99.9%
Total	**37,017**	**36,811**	**99.4%**

Source: Massport, HMMH 2020.

Statistical Analyses of Flight Tracks - Runway 15R

After takeoff, Runway 15R departures turn left approximately 30 degrees to avoid Hull, head out over Boston Harbor, and return over the shore through the Swampscott and Marblehead Gates (**Figure H-16**) to the north, or through the Hull 2, Hull 3, and Cohasset Gates to the south. The initial turn and success rate in avoidance of Hull overflights is shown in **Tables H-20a, H-20b,** and **H-20c**. The vast majority (98.6 percent in 2017 and over 99.4 percent in 2018 and 2019) of jets departing from Runway 15R cross the portion of the Hull 1 gate that is north of the Hull peninsula, as intended.

Table H-20a Runways 15R Hull 1 Gate Summary for 2017

	Number of Tracks Through Gate Segment	Percentage of Tracks Through Gate Segment
North of Hull Peninsula	9,104	98.6%
Over Hull	130	1.4%
Total	**9,234**	**100.0%**

Source: Massport, HMMH 2018.

Table H-20b Runways 15R Hull 1 Gate Summary for 2018

	Number of Tracks Through Gate Segment	Percentage of Tracks Through Gate Segment
North of Hull Peninsula	8,351	99.5%
Over Hull	42	0.5%
Total	**8,393**	**100.0%**

Source: Massport, HMMH 2020.

Table H-20c Runways 15R Hull 1 Gate Summary for 2019

	Number of Tracks Through Gate Segment	Percentage of Tracks Through Gate Segment
North of Hull Peninsula	7,680	99.4%
Over Hull	44	0.6%
Total	**7,724**	**100.0%**

Source: Massport, HMMH 2020.

Tables H-21a, H-21b, and **H-21c** indicate that 98.9 percent of Runway 15R departures were above 6,000 feet when crossing the shoreline in 2019 and over 99 percent 2017 and 2018. The proportion of flights over 6,000 feet is usually lowest at the Hull 3 gate, due to that gate's proximity to the runway end. Very few departures from Runway 15R cross back over the Hull 2 gate, which is even closer to the runway end and requires a tight turn with rapid climb to achieve.

Table H-21a Runway 15R Shoreline Crossings Above 6,000 Feet for 2017			
	Number of Tracks Through Gate	**Number Above 6,000 ft**	**Percentage Above 6,000 ft**
Swampscott Gate	280	277	98.9%
Marblehead Gate	2,771	2,770	100.0%
Hull 2 Gate	16	16	100.0%
Hull 3 Gate	266	237	89.1%
Cohasset Gate	2,246	2,242	99.8%
Total	**5,579**	**5,542**	**99.3%**

Source: Massport, HMMH 2018.

Table H-21b Runway 15R Shoreline Crossings Above 6,000 Feet for 2018			
	Number of Tracks Through Gate	**Number Above 6,000 ft**	**Percentage Above 6,000 ft**
Swampscott Gate	229	227	99.1%
Marblehead Gate	2,226	2,225	100.0%
Hull 2 Gate	11	11	100.0%
Hull 3 Gate	199	178	89.4%
Cohasset Gate	2,007	2,005	99.9%
Total	**4,672**	**4,646**	**99.4%**

Source: Massport, HMMH 2020.

Table H-21c Runway 15R Shoreline Crossings Above 6,000 Feet for 2019			
	Number of Tracks Through Gate	**Number Above 6,000 ft**	**Percentage Above 6,000 ft**
Swampscott Gate	323	318	98.5%
Marblehead Gate	1,961	1,959	99.9%
Hull 2 Gate	2	1	50.0%
Hull 3 Gate	247	211	85.4%
Cohasset Gate	1,850	1,845	99.7%
Total	**4,383**	**4,334**	**98.9%**

Source: Massport, HMMH 2020.

Statistical Analyses of Flight Tracks - Runways 22R and 22L

The Squantum 2 and Hull 1 Gates (**Figure H-16**) are used to monitor the turn to 140 degrees over Boston Harbor and then passage north of Hull. The shoreline gates are used to monitor shoreline crossings, as for Runways 4R, 9, and 15R above.

Tables H-22a, H-22b, and **H-22c** show the dispersion of the jet departures from Runways 22R and 22L as they pass through the Squantum 2 Gate. The first segment of the 27,000-foot wide gate is the northernmost segment and is primarily over Boston Harbor. The subsequent segments extend southward toward Quincy. The percentage of tracks passing through the first two segments of this gate, representing compliance with the noise abatement procedures, was about 93 percent for all three years shown.

Table H-22a Runways 22R and 22L Squantum 2 Gate[1] Summary for 2017

	Number of Tracks Through Gate Segment	Percentage of Tracks Through Gate Segment
0 - 12,000 ft	4,425	8.9%
12,000 - 14,000 ft	42,067	84.3%
14,000 - 21,000 ft	3,361	6.7%
21,000 - 27,000 ft	66	0.1%
Total	**49,919**	**100.0%**

Source: Massport, HMMH 2018.
1 The 27,000-foot wide Squantum 2 Gate is divided into four segments, identified in this table by distance from the northernmost point.

Table H-22b Runways 22R and 22L Squantum 2 Gate[1] Summary for 2018

	Number of Tracks Through Gate Segment	Percentage of Tracks Through Gate Segment
0 - 12,000 ft	2,423	3.8%
12,000 - 14,000 ft	56,884	89.0%
14,000 - 21,000 ft	4,575	7.2%
21,000 - 27,000 ft	65	0.1%
Total	**63,947**	**100.0%**

Source: Massport, HMMH 2020.
1 The 27,000-foot wide Squantum 2 Gate is divided into four segments, identified in this table by distance from the northernmost point.

Table H-22c Runways 22R and 22L Squantum 2 Gate[1] Summary for 2019

	Number of Tracks Through Gate Segment	Percentage of Tracks Through Gate Segment
0 - 12,000 ft	1,496	2.7%
12,000 - 14,000 ft	49,460	90.4%
14,000 - 21,000 ft	3,744	6.8%
21,000 - 27,000 ft	23	0.0%
Total	**54,723**	**100.0%**

Source: Massport, HMMH 2017.
1 The 27,000-foot wide Squantum 2 Gate is divided into four segments, identified in this table by distance from the northernmost point.

Massport uses the Hull 1 Gate to monitor departures from Runways 22R and 22L as well as from Runway 15R as they make their initial turn over Boston Harbor. **Tables H-23a**, **H-23b,** and **H-23c** indicate that the percent of tracks crossing north of the Hull peninsula as they passed through the Hull 1 Gate were close to 99 percent for all three years shown.

Table H-23a Runways 22R and 22L Hull 1 Gate Summary for 2017

	Number of Tracks Through Gate Segment	Percentage of Tracks Through Gate Segment
North of Hull Peninsula	49,304	99.0%
Over Hull	521	1.0%
Total	**49,825**	**100.0%**

Source: Massport, HMMH 2018.

Table H-23b Runways 22R and 22L Hull 1 Gate Summary for 2018

	Number of Tracks Through Gate Segment	Percentage of Tracks Through Gate Segment
North of Hull Peninsula	63,606	99.1%
Over Hull	594	0.9%
Total	**64,200**	**100.0%**

Source: Massport, HMMH 2020.

Table H-23c Runways 22R and 22L Hull 1 Gate Summary for 2019

	Number of Tracks Through Gate Segment	Percentage of Tracks Through Gate Segment
North of Hull Peninsula	54,073	98.9%
Over Hull	598	1.1%
Total	**54,671**	**100.0%**

Source: Massport, HMMH 2020.

Tables H-24a, **H-24b,** and **H-24c** indicate the percent of Runway 22R and 22L departures that were above 6,000 feet when crossing the shoreline. Combined compliance for all the gates was 99.8 percent for all three years shown, with over 90 percent compliance at each individual gate. The Hull 2 gate, closest to the Airport on the south shore, had the fewest crossings and also the lowest compliance rate.

Table H-24a Runways 22R and 22L Shoreline Crossings Above 6,000 Feet for 2017

	Number of Tracks Through Gate	Number Above 6,000 ft	Percentage Above 6,000 ft
Revere Gate	58	55	94.8%
Swampscott Gate	797	796	99.9%
Marblehead Gate	12,645	12,639	100.0%
Hull 2 Gate	36	33	91.7%
Hull 3 Gate	1,608	1,565	97.3%
Cohasset Gate	19,978	19,963	99.9%
Total	**35,122**	**35,051**	**99.8%**

Source: Massport, HMMH 2018.

Table H-24b Runways 22R and 22L Shoreline Crossings Above 6,000 Feet for 2018

	Number of Tracks Through Gate	Number Above 6,000 ft	Percentage Above 6,000 ft
Revere Gate	62	62	100.0%
Swampscott Gate	1,432	1,430	99.9%
Marblehead Gate	16,337	16,331	100.0%
Hull 2 Gate	39	37	94.9%
Hull 3 Gate	2,678	2,617	97.7%
Cohasset Gate	25,046	25,039	100.0%
Total	**45,594**	**45,516**	**99.8%**

Source: Massport, HMMH 2020.

Table H-24c Runways 22R and 22L Shoreline Crossings Above 6,000 Feet for 2019

	Number of Tracks Through Gate	Number Above 6,000 ft	Percentage Above 6,000 ft
Revere Gate	96	96	100.0%
Swampscott Gate	2,017	2,017	100.0%
Marblehead Gate	13,237	13,233	100.0%
Hull 2 Gate	44	40	90.9%
Hull 3 Gate	3,560	3,484	97.9%
Cohasset Gate	19,402	19,395	100.0%
Total	**38,356**	**38,265**	**99.8%**

Source: Massport, HMMH 2020.

Statistical Analyses of Flight Tracks - Runway 27

On September 15, 1996, FAA implemented a new departure procedure for Runway 27 called the WYLYY RNAV procedure. In accordance with the provisions of the ROD issued for the Runway 27 Environmental Impact Statement, Massport has been providing on-going radar flight track data and analysis to FAA with respect to the procedure.

In 2012, for the first time since 1997 when flight track monitoring began, each gate (Gates A through E) averaged over 68 percent for every month in which the Airport had all runways open and for the annual average. The percent of flight tracks through all gates (a number tracked but not required per the 1996 ROD) rounded up to 68 percent for the last two months of 2011 and continued for all of 2012. FAA had discussed these data internally and concluded that acceptable flight track dispersion had been achieved and that no subsequent action by FAA is required per the 1996 ROD requirements.[21]

Massport continues to provide annual data monitoring this flight corridor. **Table H-25a** presents the conformance results for 2017 and **Tables H-25b** and **H-25c** do so for 2018 and 2019 respectively. Gate A is closest to the Airport, with each subsequently labeled gate further from the runway. The gates increase in width as the distance is increased along the flight path, together forming a noise abatement corridor. A consistent percentage of traffic through each gate means that flights are not entering the corridor late or exiting the corridor too early. The average percentage of tracks through the entire corridor rose from 84.9 percent in 2017 to 86.9 percent in 2018 and then to 89.2 percent in 2019. The average percent through each gate increased from 94.0 percent in 2017 to 98.7 percent for both 2018 and 2019.

Table H-25a Runway 27 Corridor Percent of Tracks Through Each Gate for 2017

Month	Total # of Tracks	Total # of Tracks Through All Gates	Percent of Tracks Through All Gates	Gate A	Gate B	Gate C	Gate D	Gate E	Average Percent Through Each Gate
				1,400[1]	2,200[1]	2,900[1]	4,700[1]	6,300[1]	
January	2,257	1,811	80.2%	1,843	2,012	2,060	2,079	2,074	89.2%
February	1,883	1,597	84.8%	1,635	1,797	1,844	1,858	1,847	95.4%
March	2,513	2,140	85.2%	2,198	2,428	2,468	2,485	2,467	95.9%
April	1,152	954	82.8%	983	1,063	1,082	1,089	1,082	92.0%
May	2,200	1,894	86.1%	1,925	2,113	2,168	2,183	2,179	96.1%
June	2,412	2,131	88.3%	2,165	2,331	2,381	2,397	2,386	96.7%
July	1,922	1,729	90.0%	1,762	1,860	1,901	1,909	1,898	97.1%
August	2,335	1,956	83.8%	1,994	2,109	2,169	2,186	2,170	91.0%
September	2,377	2,110	88.8%	2,149	2,292	2,348	2,367	2,353	96.8%
October	1,627	1,426	87.6%	1,452	1,569	1,593	1,613	1,605	96.3%
November	2,177	1,762	80.9%	1,795	1,991	2,038	2,048	2,036	91.0%
December	2,776	2,240	80.7%	2,314	2,533	2,589	2,610	2,573	90.9%
Average	**2,136**	**1,813**	**84.9%**	**1,851**	**2,008**	**2,053**	**2,069**	**2,056**	**94.0%**

Source: Massport, HMMH 2018.
1 The numbers below the gate names indicate the width of each gate, in feet.

21 Logan Airport Runway 27 Advisory Committee Meeting - January 23, 2012 meeting minutes.

Table H-25b Runway 27 Corridor Percent of Tracks Through Each Gate for 2018

Month	Total # of Tracks	Total # of Tracks Through All Gates	Percent of Tracks Through All Gates	Gate A 1,400[1]	Gate B 2,200[1]	Gate C 2,900[1]	Gate D 4,700[1]	Gate E 6,300[1]	Average Percent Through Each Gate
January	1,761	1,504	85.4%	1,534	1,707	1,742	1,756	1,754	99.6%
February	1,724	1,470	85.3%	1,504	1,669	1,702	1,717	1,706	99.0%
March	1,711	1,452	84.9%	1,490	1,666	1,700	1,702	1,688	98.7%
April	1,987	1,710	86.1%	1,748	1,893	1,942	1,971	1,964	98.8%
May	1,273	1,118	87.8%	1,157	1,215	1,233	1,251	1,243	97.6%
June	1,477	1,308	88.6%	1,342	1,415	1,454	1,466	1,459	98.8%
July	816	674	82.6%	697	727	764	792	802	98.3%
August	916	827	90.3%	852	882	893	902	897	97.9%
September	360	326	90.6%	331	350	356	359	358	99.4%
October	1,471	1,280	87.0%	1,311	1,412	1,441	1,462	1,453	98.8%
November	1,665	1,455	87.4%	1,488	1,616	1,645	1,658	1,652	99.2%
December	2,772	2,425	87.5%	2,493	2,693	2,733	2,749	2,733	98.6%
Average	**1,494**	**1,296**	**86.9%**	**1,329**	**1,437**	**1,467**	**1,482**	**1,476**	**98.7%**

Source: Massport, HMMH 2020.

Table H-25c Runway 27 Corridor Percent of Tracks Through Each Gate for 2019

Month	Total # of Tracks	Total # of Tracks Through All Gates	Percent of Tracks Through All Gates	Gate A 1,400[1]	Gate B 2,200[1]	Gate C 2,900[1]	Gate D 4,700[1]	Gate E 6,300[1]	Average Percent Through Each Gate
January	2,033	1,781	87.6%	1,823	1,969	2,004	2,018	2,012	99.6%
February	2,385	2,124	89.1%	2,177	2,315	2,360	2,364	2,352	99.0%
March	1,323	1,180	89.2%	1,208	1,290	1,314	1,317	1,307	98.7%
April	1,915	1,658	86.6%	1,705	1,831	1,881	1,896	1,884	98.8%
May	1,311	1,161	88.6%	1,195	1,268	1,293	1,304	1,298	97.6%
June	1,228	1,090	88.8%	1,117	1,196	1,210	1,219	1,211	98.8%
July	1,311	1,203	91.8%	1,230	1,278	1,300	1,305	1,292	98.3%
August	1,303	1,175	90.2%	1,210	1,267	1,284	1,292	1,276	97.9%
September	1,941	1,750	90.2%	1,793	1,886	1,917	1,931	1,917	99.4%
October	1,445	1,307	90.4%	1,346	1,411	1,434	1,431	1,419	98.8%
November	2,710	2,411	89.0%	2,437	2,639	2,682	2,698	2,691	99.2%
December	2,445	2,176	89.0%	2,217	2,371	2,421	2,435	2,426	98.6%
Average	**1,779**	**1,585**	**89.2%**	**1,622**	**1,727**	**1,758**	**1,768**	**1,757**	**98.7%**

Source: Massport, HMMH 2020.

Statistical Analyses of Flight Tracks — Runway 33L

The Somerville and Everett Gates (**Figure H-16**) extend from BOS 2 DME to BOS 5 DME and are used to monitor the departure procedure for Runway 33L. Turns to the left prior to the BOS 5 DME would pass through the Somerville Gate. Turns to the right prior to the BOS 5 DME would pass through the Everett Gate.

Tables H-26a, **H-26b,** and **H-26c** indicate that the percentage of jet aircraft departing from Runway 33L tracks and turning before BOS 5 DME while still below 3,000 feet increased from 1.5 percent in 2017 and 2018 to 1.9 percent in 2019.

Table H-26a Runway 33L Gates — Passages Below 3,000 Feet for 2017

	Number of Tracks Through Gate	Number Turning Below 3,000 ft	Percentage Through Gate When Below 3,000 ft
Everett Gate	316	262	0.6%
Somerville Gate	462	357	0.9%
Neither gate	39,727		
Total	**40,347**	**619**	**1.5%**

Source: Massport, HMMH 2018.

Table H-26b Runway 33L Gates — Passages Below 3,000 Feet for 2018

	Number of Tracks Through Gate	Number Turning Below 3,000 ft	Percentage Through Gate When Below 3,000 ft
Everett Gate	185	136	0.5%
Somerville Gate	405	323	1.1%
Neither gate	29,241		
Total	**29,831**	**459**	**1.5%**

Source: Massport, HMMH 2020.

Table H-26c Runway 33L Gates — Passages Below 3,000 Feet for 2019

	Number of Tracks Through Gate	Number Turning Below 3,000 ft	Percentage Through Gate When Below 3,000 ft
Everett Gate	251	211	0.6%
Somerville Gate	596	499	1.4%
Neither gate	35,673		
Total	**36,520**	**710**	**1.9%**

Source: Massport, HMMH 2020.

2018 and 2019 DNL Levels for Census Block Group Locations

Table H-26 reports the DNL value for each Census block group down to DNL 50 dB, computed with AEDT for 2018 and 2019. A Census Block Group represents the outer limits of a group of US Census Blocks. The Average Block DNL provided below is the arithmetic average of the DNL modeled at each US Census Block in that group. The DNL at centroid represents the DNL modeled at the geographic center of the US Census Block Group.

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250173561002	Arlington	1460	681	49.1	49.1	49.9	49.9
250173567011	Arlington	1316	610	49.1	49.2	49.9	50.0
250250105002	Back Bay	1099	744	49.7	49.7	50.4	50.4
250250105003	Back Bay	992	674	50.1	50.1	50.8	50.8
250250105003	Back Bay	992	674	50.1	50.1	50.8	50.8
250250106001	Back Bay	1559	1383	49.8	49.6	50.5	50.3
250250106002	Back Bay	1299	942	50.1	50.2	50.9	51.0
250250107021	Back Bay	663	482	49.7	50.0	50.4	50.7
250250107022	Back Bay	775	465	49.0	49.0	49.6	49.6
250250107023	Back Bay	962	696	50.0	50.0	50.7	50.6
250250108011	Back Bay	664	354	49.6	49.6	50.3	50.2
250250108012	Back Bay	964	678	49.1	49.1	49.7	49.7
250250707001	Back Bay	1161	644	51.2	51.2	52.0	52.0
250250707001	Back Bay	1161	644	51.2	51.2	52.0	52.0
250250708003	Back Bay	1072	612	50.6	50.7	51.4	51.5
250250708003	Back Bay	1072	612	50.6	50.7	51.4	51.5
250250201011	Beacon Hill	767	480	50.1	50.1	50.7	50.7
250250201012	Beacon Hill	896	691	49.6	49.6	50.2	50.1
250250201013	Beacon Hill	1268	821	50.4	50.5	51.0	51.1
250250201014	Beacon Hill	1262	822	50.0	50.0	50.6	50.6
250250202001	Beacon Hill	1266	897	50.4	50.4	50.9	51.0
250250202002	Beacon Hill	1259	847	50.1	50.0	50.6	50.6
250250202003	Beacon Hill	1124	734	49.6	49.6	50.1	50.1
250250203021	Beacon Hill	1181	721	50.9	51.0	51.5	51.6
250250303003	Beacon Hill	1305	503	52.1	52.0	52.6	52.5
250250303003	Beacon Hill	1305	503	52.1	52.0	52.6	52.5
250250701013	Beacon Hill	494	381	52.6	52.5	53.2	53.2
250250701013	Beacon Hill	494	381	52.6	52.5	53.2	53.2
250250104053	Brighton	626	355	49.5	49.6	50.3	50.4
250173548001	Cambridge	911	444	49.9	49.9	50.7	50.7

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250173548002	Cambridge	992	533	49.1	49.2	49.9	50.0
250173549001	Cambridge	1126	535	49.7	49.7	50.5	50.6
250173549002	Cambridge	3201	1231	49.4	49.4	50.3	50.3
250173549003	Cambridge	1731	866	49.6	49.1	50.5	49.9
250173550001	Cambridge	671	331	49.8	49.7	50.6	50.6
250173550002	Cambridge	1183	645	50.0	50.0	50.9	50.9
250173550003	Cambridge	835	437	49.9	50.0	50.8	50.9
250250401001	Charlestown	958	555	51.3	51.4	51.8	51.9
250250401002	Charlestown	1210	684	50.7	50.7	51.3	51.4
250250402001	Charlestown	775	304	52.9	53.0	53.6	53.7
250250402002	Charlestown	831	423	51.8	51.8	52.5	52.5
250250403001	Charlestown	739	334	51.9	51.8	52.6	52.5
250250403002	Charlestown	1247	662	51.1	51.0	51.7	51.7
250250403003	Charlestown	657	366	51.0	51.1	51.7	51.7
250250403004	Charlestown	617	320	51.3	51.4	52.0	52.1
250250403005	Charlestown	622	355	50.4	50.4	51.2	51.1
250250404011	Charlestown	1689	766	50.0	49.8	50.7	50.5
250250404012	Charlestown	750	456	50.2	50.0	50.9	50.6
250250406001	Charlestown	863	485	50.0	51.0	50.8	51.8
250250406002	Charlestown	1581	843	50.7	50.7	51.4	51.5
250250408011	Charlestown	1061	530	52.3	52.4	53.0	53.0
250250408012	Charlestown	828	263	53.7	55.1	54.4	55.9
250250408013	Charlestown	2011	1296	53.4	53.6	54.0	54.2
250251601011	Chelsea	1332	353	61.4	61.3	62.5	62.4
250251601012	Chelsea	1372	438	59.3	59.3	60.2	60.2
250251601013	Chelsea	1730	568	61.0	62.1	61.9	63.1
250251601014	Chelsea	2092	539	58.2	58.2	59.0	59.0
250251601015	Chelsea	1025	261	62.8	63.0	64.0	64.2
250251602001	Chelsea	1336	357	60.6	60.7	61.7	61.8
250251602002	Chelsea	1210	374	61.8	61.9	63.0	63.1
250251602003	Chelsea	1497	494	62.4	62.7	63.7	63.9
250251603001	Chelsea	1469	913	60.0	59.5	61.2	60.6
250251603002	Chelsea	596	366	61.5	61.5	62.7	62.6
250251604001	Chelsea	933	344	59.1	58.8	60.2	59.9
250251604002	Chelsea	1783	683	60.4	60.3	61.6	61.5
250251605011	Chelsea	2097	646	54.9	54.8	55.8	55.6

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250251605012	Chelsea	1231	396	55.4	55.6	56.1	56.3
250251605013	Chelsea	774	233	56.7	56.6	57.6	57.5
250251605014	Chelsea	754	392	55.7	55.6	56.5	56.5
250251605015	Chelsea	748	304	54.5	54.7	55.3	55.5
250251605021	Chelsea	1703	623	54.2	55.5	54.7	56.0
250251605022	Chelsea	1359	477	52.6	54.7	52.9	54.9
250251605023	Chelsea	1398	488	55.1	54.8	55.8	55.5
250251606011	Chelsea	2158	1005	52.4	52.0	52.9	52.5
250251606012	Chelsea	1905	563	53.3	53.2	53.9	53.9
250251606021	Chelsea	1290	470	52.4	52.2	53.2	53.0
250251606022	Chelsea	795	304	50.4	50.2	51.0	50.8
250251606023	Chelsea	825	346	49.0	49.1	49.5	49.6
250251606024	Chelsea	780	271	50.5	50.5	51.0	51.0
250251606025	Chelsea	985	409	51.2	51.1	51.9	51.7
250250701011	Chinatown	850	529	55.9	56.9	56.7	57.7
250250701011	Chinatown	850	529	55.9	56.9	56.7	57.7
250250702001	Chinatown	1460	599	54.7	54.7	55.5	55.6
250250702003	Chinatown	2625	647	53.5	53.4	54.3	54.2
250250702003	Chinatown	2625	647	53.5	53.4	54.3	54.2
250250801001	Dorchester	2612	450	55.4	55.8	56.2	56.6
250250801001	Dorchester	2612	450	55.4	55.8	56.2	56.6
250250907001	Dorchester	1218	518	51.8	52.0	52.2	52.4
250250907002	Dorchester	1253	644	52.9	53.0	53.4	53.5
250250907003	Dorchester	1153	526	52.1	52.1	52.5	52.5
250250907004	Dorchester	651	302	54.0	54.6	54.6	55.2
250250907004	Dorchester	651	302	54.0	54.6	54.6	55.2
250250909011	Dorchester	1627	606	52.5	52.2	52.5	52.3
250250909012	Dorchester	2103	1034	53.8	54.7	53.8	54.6
250250910011	Dorchester	650	248	49.7	49.6	49.9	49.9
250250910012	Dorchester	743	363	49.9	49.7	50.1	49.8
250250910013	Dorchester	682	335	50.8	52.0	50.9	51.9
250250910014	Dorchester	667	369	51.2	50.8	51.3	50.9
250250911001	Dorchester	1395	625	51.0	50.9	51.2	51.2
250250911002	Dorchester	1007	465	50.4	50.3	50.6	50.5
250250911003	Dorchester	929	325	50.3	50.4	50.6	50.7

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250250911004	Dorchester	713	254	50.4	50.4	50.7	50.7
250250911005	Dorchester	817	297	51.1	51.0	51.4	51.4
250250912001	Dorchester	1081	451	51.7	51.8	52.2	52.3
250250912002	Dorchester	1411	492	50.8	50.9	51.2	51.3
250250912003	Dorchester	742	296	51.6	51.7	52.1	52.2
250250913001	Dorchester	1368	480	52.8	52.8	53.3	53.3
250250913002	Dorchester	1131	388	53.8	53.8	54.5	54.5
250250913002	Dorchester	1131	388	53.8	53.8	54.5	54.5
250250914001	Dorchester	1672	584	52.0	52.2	52.6	52.8
250250915001	Dorchester	1978	744	50.7	50.5	51.1	50.9
250250915002	Dorchester	1494	547	50.6	50.5	51.0	51.0
250250915003	Dorchester	898	362	49.7	49.6	50.1	50.0
250250918001	Dorchester	1517	517	50.4	50.4	50.9	50.8
250250918002	Dorchester	1002	340	50.0	50.2	50.5	50.7
250250918003	Dorchester	933	357	50.2	50.2	50.7	50.7
250250919001	Dorchester	1042	329	50.0	50.0	50.5	50.5
250250919002	Dorchester	709	280	49.2	49.2	49.7	49.6
250250919003	Dorchester	1522	551	49.3	49.4	49.8	49.9
250250921011	Dorchester	1113	467	52.1	52.2	52.1	52.1
250250921013	Dorchester	729	321	51.5	52.9	51.5	52.8
250250921014	Dorchester	1008	397	49.7	49.9	49.7	49.9
250251006011	Dorchester	1094	488	53.6	53.6	53.5	53.5
250251006012	Dorchester	898	382	52.0	51.8	51.9	51.7
250251006013	Dorchester	1218	535	50.3	50.3	50.2	50.3
250251006031	Dorchester	1306	556	57.2	57.6	57.0	57.4
250251006032	Dorchester	598	284	59.6	60.2	59.4	59.9
250251007001	Dorchester	1050	484	55.8	55.8	55.6	55.6
250251007002	Dorchester	1027	526	57.7	59.0	57.4	58.7
250251007003	Dorchester	672	290	57.4	57.6	57.2	57.4
250251007004	Dorchester	856	371	54.3	54.5	54.2	54.3
250251007005	Dorchester	717	303	53.6	53.6	53.4	53.4
250251008001	Dorchester	663	272	49.7	49.6	49.7	49.6
250251008002	Dorchester	929	378	51.4	51.4	51.3	51.3
250251008003	Dorchester	899	412	51.7	51.7	51.5	51.6
250251008004	Dorchester	1117	666	51.9	53.1	51.8	52.9

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250251008005	Dorchester	807	461	50.2	50.0	50.1	49.9
250251008006	Dorchester	1131	513	49.6	49.4	49.5	49.4
250250203011	Downtown Boston	350	205	50.1	49.8	50.6	50.3
250250203012	Downtown Boston	1673	1209	50.0	49.9	50.5	50.4
250250203031	Downtown Boston	878	693	50.5	50.5	50.9	50.9
250250203032	Downtown Boston	1343	365	51.1	50.7	51.5	51.1
250250203033	Downtown Boston	1179	789	50.2	50.2	50.7	50.7
250250301001	Downtown Boston	1053	790	52.2	52.3	52.7	52.7
250250301002	Downtown Boston	901	587	51.9	51.9	52.3	52.3
250250302001	Downtown Boston	1665	1103	52.1	52.0	52.5	52.5
250250303001	Downtown Boston	1757	1283	54.5	55.0	54.9	55.5
250250303002	Downtown Boston	1262	696	53.4	53.5	53.9	54.0
250250303004	Downtown Boston	548	465	53.1	53.4	53.7	54.0
250250304001	Downtown Boston	1519	994	52.9	52.7	53.3	53.1
250250304002	Downtown Boston	932	665	52.7	52.6	53.1	53.0
250250305001	Downtown Boston	704	442	53.5	53.2	53.9	53.6
250250305002	Downtown Boston	1025	687	53.3	53.2	53.7	53.6
250250305003	Downtown Boston	809	527	52.9	52.9	53.3	53.3
250250701012	Downtown Boston	303	90	53.5	53.5	54.2	54.2
250250701014	Downtown Boston	1887	941	52.7	52.8	53.5	53.5
250250701015	Downtown Boston	451	161	53.1	53.1	53.9	53.8
250250701016	Downtown Boston	366	325	53.3	53.3	54.1	54.1
250250701017	Downtown Boston	1102	701	54.3	54.5	55.1	55.2
250250701018	Downtown Boston	449	246	54.7	54.9	55.4	55.6
250250702002	Downtown Boston	1133	444	55.1	55.2	56.0	56.1
250250703001	Downtown Boston	1065	804	52.0	51.8	52.8	52.6
250250703002	Downtown Boston	733	449	52.8	52.8	53.6	53.6
250250501011	Eagle Hill East Boston	1713	534	61.1	61.6	62.0	62.6
250250501012	Eagle Hill East Boston	1472	632	59.5	58.9	60.4	59.8
250250501013	Eagle Hill East Boston	1930	684	60.6	60.4	61.4	61.3
250250502001	Eagle Hill East Boston	2189	757	59.5	59.5	60.2	60.2
250250502002	Eagle Hill East Boston	1151	445	59.0	58.9	59.7	59.6
250250502003	Eagle Hill East Boston	836	283	62.6	62.5	63.5	63.4
250250502004	Eagle Hill East Boston	1055	349	62.8	62.8	63.7	63.7
250250507001	Eagle Hill East Boston	1684	617	59.2	59.5	59.7	60.0

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250250507001	Eagle Hill East Boston	1684	617	59.2	59.5	59.7	60.0
250250507002	Eagle Hill East Boston	1344	484	61.0	61.0	61.7	61.6
250250507003	Eagle Hill East Boston	1476	505	62.3	62.4	63.0	63.0
250250509011	Eagle Hill East Boston	1283	420	66.1	66.5	67.2	67.7
250250509012	Eagle Hill East Boston	1964	717	63.9	63.5	65.0	64.5
250250509013	Eagle Hill East Boston	918	309	63.8	64.4	64.8	65.6
250250503001	East Boston	727	282	57.0	56.2	57.4	56.7
250250503002	East Boston	1524	759	56.2	55.9	56.5	56.2
250250504001	East Boston	637	237	57.1	57.0	57.4	57.3
250250504002	East Boston	1735	797	57.8	57.8	58.0	58.1
250250505001	East Boston	1857	702	59.6	59.5	59.9	59.7
250250506001	East Boston	1248	494	58.3	58.4	58.8	58.8
250250506002	East Boston	815	312	57.7	58.0	58.1	58.4
250250510001	East Boston	2039	855	64.4	64.2	64.6	64.4
250250510002	East Boston	962	462	60.8	58.5	60.7	58.7
250250510003	East Boston	1088	467	63.3	62.9	63.8	63.4
250250511013	East Boston	1537	621	63.0	62.7	63.0	62.7
250250511013	East Boston	1537	621	63.0	62.7	63.0	62.7
250259813002	East Boston	389	244	60.6	78.7	60.9	78.2
250173421011	Everett	1483	567	49.7	49.8	50.4	50.5
250173421012	Everett	1067	389	50.2	50.3	50.9	51.0
250173421014	Everett	943	362	50.1	50.0	50.7	50.6
250173422011	Everett	2830	1066	49.0	48.9	49.8	49.7
250173422012	Everett	2438	996	49.8	49.7	50.5	50.5
250173423001	Everett	1327	495	51.3	51.1	52.1	51.9
250173423002	Everett	1555	596	52.1	52.1	53.0	52.9
250173423003	Everett	2137	858	53.5	53.5	54.5	54.4
250173423004	Everett	1807	805	52.3	52.4	53.2	53.4
250173424001	Everett	1878	847	55.5	55.3	56.5	56.3
250173424002	Everett	1132	480	55.9	56.4	56.9	57.5
250173424003	Everett	905	346	56.7	55.7	57.8	56.8
250173424004	Everett	1348	517	57.4	58.0	58.5	59.2
250173424005	Everett	792	363	53.0	52.9	53.9	53.8
250173425001	Everett	2428	941	50.4	50.6	51.1	51.3
250173425002	Everett	2169	870	53.0	52.8	53.8	53.7

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250173425003	Everett	2200	970	55.2	55.2	56.1	56.2
250173426001	Everett	1125	395	52.3	52.2	53.1	53.0
250173426002	Everett	904	347	53.9	54.2	54.7	55.1
250173426003	Everett	2336	941	53.0	53.1	53.9	53.9
250235001011	Hull	1502	828	56.0	57.0	55.8	56.7
250235001012	Hull	819	452	53.0	52.8	52.7	52.5
250235001013	Hull	1381	726	51.1	51.8	51.0	51.8
250235001041	Hull	1207	626	50.2	53.9	50.3	54.4
250235001042	Hull	919	488	50.5	53.6	51.0	54.2
250235001043	Hull	792	470	49.9	50.4	50.5	51.0
250235001044	Hull	1464	731	49.7	49.6	50.1	50.0
250251404007	Hyde Park	1172	463	48.8	48.8	49.5	49.5
250250812001	Jamaica Plain	2130	813	48.8	48.7	49.6	49.6
250250814003	Jamaica Plain	1164	548	49.4	49.7	50.3	50.5
250250814003	Jamaica Plain	1164	548	49.4	49.7	50.3	50.5
250251201041	Jamaica Plain	516	252	49.8	49.4	50.6	50.2
250251201042	Jamaica Plain	799	351	49.2	49.2	50.0	50.1
250251202011	Jamaica Plain	1147	611	50.2	50.3	51.0	51.1
250251202012	Jamaica Plain	1841	894	51.4	51.4	52.2	52.3
250251202013	Jamaica Plain	451	221	51.3	51.3	52.1	52.1
250251203013	Jamaica Plain	1543	554	51.9	52.2	52.8	53.0
250251203013	Jamaica Plain	1543	554	51.9	52.2	52.8	53.0
250251204001	Jamaica Plain	856	424	49.8	49.9	50.7	50.7
250251204002	Jamaica Plain	676	363	50.0	50.0	50.8	50.9
250251204003	Jamaica Plain	895	466	49.3	49.3	50.1	50.1
250251205001	Jamaica Plain	824	334	49.5	49.5	50.3	50.3
250251205003	Jamaica Plain	774	301	49.0	48.9	49.9	49.8
250259810001	Jamaica Plain	22	5	49.4	49.1	50.2	49.9
250259810001	Jamaica Plain	22	5	49.4	49.1	50.2	49.9
250250512001	Jefferies Point	32	19	61.1	59.5	61.2	59.7
250250512002	Jefferies Point	1548	692	60.1	59.7	60.3	59.9
250250512003	Jefferies Point	799	449	58.9	59.0	59.1	59.1
250092051001	Lynn	1192	534	53.0	53.0	52.7	52.7
250092051002	Lynn	1077	413	53.6	53.7	53.2	53.4
250092051003	Lynn	919	361	55.5	55.7	55.1	55.3

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250092051004	Lynn	1527	556	55.5	55.9	55.1	55.5
250092051005	Lynn	637	264	56.2	56.5	55.8	56.1
250092052001	Lynn	806	410	54.1	54.5	53.6	54.1
250092052002	Lynn	714	277	56.4	56.6	56.0	56.2
250092052003	Lynn	1510	564	56.4	56.4	56.0	56.0
250092052004	Lynn	1435	511	57.1	57.3	56.7	56.9
250092052005	Lynn	854	385	53.8	54.6	53.4	54.2
250092053001	Lynn	1586	591	49.9	50.3	49.5	49.9
250092053002	Lynn	909	352	50.8	50.3	50.4	49.9
250092055001	Lynn	2054	736	53.5	52.5	53.1	52.1
250092055002	Lynn	2552	961	57.9	57.8	57.5	57.4
250092058001	Lynn	1044	362	53.0	53.5	52.7	53.1
250092058002	Lynn	1089	342	53.6	53.7	53.3	53.4
250092058003	Lynn	1179	435	52.3	51.2	52.0	50.9
250092059001	Lynn	1743	598	53.4	53.5	53.0	53.2
250092059002	Lynn	1262	443	52.5	52.5	52.2	52.2
250092059003	Lynn	1345	502	50.7	50.4	50.3	50.1
250092060001	Lynn	1443	478	57.3	57.5	57.0	57.2
250092060002	Lynn	1916	642	55.9	56.4	55.6	56.0
250092061001	Lynn	1793	797	57.7	57.9	57.4	57.6
250092061002	Lynn	2051	665	58.3	58.5	58.0	58.1
250092062001	Lynn	1128	327	55.9	56.0	55.5	55.7
250092062002	Lynn	2267	786	57.6	57.8	57.2	57.5
250092062003	Lynn	1859	573	56.4	56.4	56.1	56.1
250092063001	Lynn	712	250	53.4	54.1	53.0	53.7
250092063002	Lynn	991	316	51.7	51.4	51.4	51.1
250092063003	Lynn	1030	379	52.7	52.7	52.4	52.4
250092063004	Lynn	1040	367	54.8	55.0	54.5	54.7
250092064001	Lynn	1018	363	50.1	49.9	49.8	49.7
250092064002	Lynn	1847	722	49.5	49.5	49.2	49.2
250092064004	Lynn	1342	493	51.7	51.4	51.4	51.1
250092065003	Lynn	1148	394	50.0	49.9	49.8	49.6
250092067004	Lynn	1182	684	49.7	49.8	49.5	49.6
250092068001	Lynn	1754	685	52.3	52.2	52.0	51.9
250092068002	Lynn	1792	914	54.3	54.2	54.0	53.9

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250092069001	Lynn	641	549	51.7	51.7	51.5	51.5
250092069002	Lynn	1910	1005	50.0	49.8	49.8	49.7
250092069003	Lynn	1414	838	51.6	51.3	51.4	51.2
250092070001	Lynn	963	585	57.4	55.4	57.2	55.2
250092070002	Lynn	1235	456	58.6	58.9	58.3	58.6
250092071001	Lynn	1446	444	56.8	57.2	56.4	56.8
250092071002	Lynn	992	307	58.3	58.5	58.0	58.1
250092071003	Lynn	1075	342	55.7	55.7	55.3	55.4
250092072001	Lynn	1212	391	57.8	60.0	57.5	59.6
250092072002	Lynn	1727	789	58.8	59.1	58.5	58.8
250173411024	Malden	557	336	48.8	48.5	49.8	49.5
250173412002	Malden	976	386	49.8	50.0	50.8	50.9
250173412003	Malden	1070	451	52.1	52.3	53.1	53.3
250173412004	Malden	978	383	52.0	52.0	53.0	53.0
250173412005	Malden	1693	713	50.5	50.7	51.5	51.6
250173412006	Malden	976	362	49.7	49.6	50.7	50.6
250173412006	Malden	976	362	49.7	49.6	50.7	50.6
250173414003	Malden	1802	702	49.2	49.3	50.0	50.1
250173414004	Malden	1612	603	49.6	49.6	50.5	50.5
250173414005	Malden	769	389	51.4	52.0	52.3	52.9
250250924004	Mattapan	1142	413	50.5	50.6	51.1	51.2
250250924005	Mattapan	721	276	50.4	50.4	51.0	51.1
250250924005	Mattapan	721	276	50.4	50.4	51.0	51.1
250251001001	Mattapan	167	61	49.8	50.0	50.4	50.7
250251001004	Mattapan	964	298	49.2	49.2	49.9	49.8
250251001006	Mattapan	1320	492	49.1	49.0	49.8	49.6
250259811004	Mattapan	400	128	50.2	50.3	51.0	51.0
250173391001	Medford	617	243	48.4	49.5	49.6	50.8
250173391002	Medford	1460	603	51.0	51.0	52.3	52.3
250173391003	Medford	1169	691	51.5	51.7	52.6	52.9
250173391004	Medford	1797	1041	50.5	50.8	51.6	51.9
250173391005	Medford	1399	446	49.5	49.7	50.6	50.9
250173394001	Medford	1033	529	49.6	49.4	50.5	50.3
250173394002	Medford	626	251	50.0	50.0	50.9	50.9
250173394003	Medford	785	373	49.7	49.8	50.6	50.7

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250173394004	Medford	882	420	49.4	49.3	50.3	50.1
250173395001	Medford	2710	553	50.9	51.2	51.9	52.1
250173395002	Medford	1312	547	51.9	52.1	52.9	53.1
250173395003	Medford	641	283	50.7	50.7	51.7	51.7
250173395004	Medford	736	307	50.9	50.9	51.8	51.9
250173396001	Medford	797	392	52.2	52.1	53.2	53.0
250173396002	Medford	813	371	52.4	52.4	53.3	53.3
250173396003	Medford	757	369	52.0	52.1	52.9	53.0
250173396004	Medford	827	363	51.8	51.9	52.7	52.8
250173396005	Medford	885	377	51.4	51.4	52.3	52.3
250173396006	Medford	945	443	51.1	51.2	52.0	52.1
250173397001	Medford	552	280	52.9	53.7	53.9	54.7
250173397002	Medford	1678	670	52.6	52.8	53.5	53.7
250173397003	Medford	785	357	53.0	53.1	54.0	54.1
250173397004	Medford	863	377	52.0	52.0	52.9	52.9
250173398011	Medford	2101	1369	56.0	56.4	57.1	57.5
250173398012	Medford	617	263	55.5	55.6	56.7	56.8
250173398013	Medford	808	375	55.4	55.6	56.5	56.7
250173398014	Medford	884	363	54.7	54.6	55.8	55.7
250173398021	Medford	1308	586	54.8	55.1	55.9	56.3
250173398022	Medford	2498	1096	54.0	54.7	55.2	55.8
250173398023	Medford	751	294	53.3	53.3	54.5	54.5
250173399001	Medford	1651	719	53.1	53.4	54.2	54.4
250173399002	Medford	950	380	53.2	53.1	54.3	54.3
250173399003	Medford	939	425	51.7	51.6	52.7	52.7
250173399004	Medford	759	346	52.7	52.7	53.9	53.9
250173399005	Medford	872	342	52.2	52.2	53.3	53.3
250173400001	Medford	1033	435	51.1	51.2	52.2	52.2
250173400002	Medford	848	376	51.5	51.5	52.7	52.7
250173400003	Medford	713	303	52.1	52.2	53.3	53.4
250173401003	Medford	1611	504	48.6	48.4	49.7	49.5
250173401004	Medford	1483	609	50.5	50.5	51.6	51.7
250173401006	Medford	826	310	49.5	49.5	50.7	50.7
250214161011	Milton	771	280	53.8	53.8	53.5	53.4
250214161012	Milton	1969	732	54.7	55.5	54.3	55.2

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250214161013	Milton	1818	663	50.7	51.5	50.5	51.3
250214164001	Milton	789	302	53.2	56.6	53.0	56.3
250214164004	Milton	797	280	50.0	51.1	49.7	50.8
250214164005	Milton	1028	348	55.1	56.0	54.8	55.6
250214164006	Milton	978	357	53.7	55.7	53.4	55.4
250214164007	Milton	1002	386	54.7	57.2	54.5	57.0
250250511011	Orient Heights	1602	598	59.5	58.8	59.5	58.8
250250511012	Orient Heights	1949	741	57.9	57.6	57.8	57.5
250250511014	Orient Heights	1005	385	60.9	59.3	60.9	59.3
250092106001	Peabody	1586	705	51.5	52.3	51.2	51.9
250092106002	Peabody	692	270	51.0	51.0	50.5	50.6
250092106003	Peabody	1194	491	51.5	53.0	51.0	52.5
250092106004	Peabody	623	250	51.8	53.0	51.4	52.5
250092107001	Peabody	1247	522	50.7	50.8	50.4	50.5
250092107002	Peabody	865	411	51.3	51.4	51.0	51.0
250092107003	Peabody	1199	523	51.8	51.9	51.5	51.5
250092107004	Peabody	690	281	51.5	51.5	51.2	51.2
250092108001	Peabody	1337	547	50.2	50.3	50.0	50.0
250092108002	Peabody	1111	613	50.8	50.8	50.5	50.5
250092108003	Peabody	2121	1233	50.5	50.6	50.1	50.2
250092109002	Peabody	878	362	49.9	50.0	49.6	49.6
250092109003	Peabody	1813	844	50.1	50.5	49.8	50.1
250214172001	Quincy	2743	1256	52.1	52.5	51.9	52.3
250214172006	Quincy	1055	475	49.7	49.2	49.5	49.0
250214173001	Quincy	1781	1180	53.5	55.3	53.4	55.1
250214173002	Quincy	900	630	53.8	54.8	53.6	54.5
250214175023	Quincy	887	337	50.9	51.1	50.7	51.0
250251701002	Revere	1012	384	49.6	49.7	49.9	50.0
250251701003	Revere	773	320	50.2	50.2	50.5	50.5
250251704001	Revere	1102	485	51.8	50.8	51.8	50.8
250251704002	Revere	1151	506	51.0	51.2	50.9	51.1
250251705011	Revere	1934	1112	55.2	55.7	55.1	55.6
250251705012	Revere	1501	814	55.8	55.9	55.7	55.9
250251705021	Revere	1134	550	60.5	60.8	60.4	60.7
250251705022	Revere	1684	998	59.5	60.7	59.3	60.6

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250251706011	Revere	1351	557	49.5	49.6	49.5	49.6
250251706012	Revere	1413	573	51.2	51.8	51.4	51.9
250251706013	Revere	1387	497	50.0	49.9	50.1	50.0
250251706014	Revere	954	380	51.1	51.1	51.1	51.2
250251707011	Revere	788	431	56.0	57.1	55.9	57.0
250251707012	Revere	1311	622	60.7	61.0	60.6	60.9
250251707021	Revere	1146	352	54.4	54.3	54.3	54.2
250251707022	Revere	1474	509	55.9	55.7	55.9	55.6
250251707023	Revere	1658	547	52.8	52.9	52.8	52.9
250251707024	Revere	959	358	54.0	54.4	54.0	54.3
250251707025	Revere	1391	553	56.7	56.4	56.6	56.3
250251708001	Revere	1815	797	65.7	66.8	65.5	66.6
250251708002	Revere	1359	577	64.8	66.8	64.6	66.6
250251708003	Revere	967	419	63.7	65.2	63.6	65.1
250251708004	Revere	977	424	64.3	62.9	64.2	62.9
250259815021	Revere	9	3	60.3	55.7	60.2	55.7
250251101031	Roslindale	568	325	51.6	51.4	52.4	52.2
250251101032	Roslindale	733	257	50.2	50.1	50.9	50.9
250251101033	Roslindale	653	241	50.5	50.3	51.3	51.2
250251101034	Roslindale	620	289	50.8	50.8	51.6	51.6
250251101035	Roslindale	1440	666	51.1	51.0	51.9	51.9
250251101036	Roslindale	583	271	51.0	51.0	51.8	51.8
250251101037	Roslindale	863	304	50.5	50.5	51.3	51.3
250251102011	Roslindale	2051	874	49.8	49.9	50.6	50.6
250251103011	Roslindale	1134	403	50.4	50.5	51.2	51.3
250251103012	Roslindale	1271	552	50.9	50.9	51.7	51.7
250251104011	Roslindale	2011	733	50.4	50.4	51.2	51.2
250251104012	Roslindale	1555	629	50.3	50.4	51.0	51.1
250251104031	Roslindale	905	426	49.7	49.7	50.5	50.4
250251104032	Roslindale	783	314	49.9	49.9	50.6	50.6
250251104033	Roslindale	657	258	49.0	49.1	49.8	49.9
250251104034	Roslindale	975	377	49.6	49.7	50.3	50.4
250251104035	Roslindale	989	392	49.0	49.1	49.8	49.8
250251105011	Roslindale	849	367	49.0	48.9	49.6	49.6
250251105012	Roslindale	1498	631	49.0	49.0	49.6	49.7

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250251105021	Roslindale	1311	589	49.5	49.6	50.2	50.3
250251105022	Roslindale	1855	810	49.7	49.8	50.4	50.5
250251105023	Roslindale	640	285	49.3	49.3	50.0	50.0
250251106073	Roslindale	1586	734	49.4	49.5	50.2	50.3
250251401062	Roslindale	506	238	49.1	49.1	49.7	49.7
250259803001	Roslindale	338	2	52.3	52.5	53.1	53.3
250259803001	Roslindale	338	2	52.3	52.5	53.1	53.3
250259811003	Roslindale	6	5	51.4	51.6	52.2	52.4
250250801002	Roxbury	738	294	55.0	55.0	55.8	55.8
250250803001	Roxbury	1769	791	54.6	54.6	55.4	55.4
250250804011	Roxbury	1265	526	53.8	53.9	54.7	54.8
250250804011	Roxbury	1265	526	53.8	53.9	54.7	54.8
250250804012	Roxbury	1445	723	52.1	52.2	52.9	53.0
250250806012	Roxbury	600	220	50.9	50.7	51.7	51.5
250250806013	Roxbury	459	242	52.0	52.2	52.8	53.1
250250813001	Roxbury	1661	806	52.4	52.4	53.2	53.3
250250813002	Roxbury	1749	690	51.0	51.1	51.8	51.9
250250813003	Roxbury	1350	615	50.8	50.4	51.7	51.3
250250814001	Roxbury	1067	558	51.6	51.7	52.4	52.5
250250814002	Roxbury	772	355	50.2	50.2	51.0	51.1
250250815001	Roxbury	788	351	51.9	51.9	52.8	52.7
250250815002	Roxbury	1346	554	52.6	52.7	53.5	53.5
250250817001	Roxbury	619	225	54.0	54.1	54.8	55.0
250250817002	Roxbury	893	430	54.1	54.1	54.9	55.0
250250817003	Roxbury	780	291	53.4	53.3	54.2	54.1
250250817004	Roxbury	887	355	53.4	53.4	54.2	54.2
250250817005	Roxbury	641	298	53.3	53.3	54.2	54.2
250250818001	Roxbury	1157	577	54.5	54.5	55.3	55.4
250250818002	Roxbury	921	442	54.6	54.6	55.4	55.4
250250818003	Roxbury	820	369	54.2	54.2	55.0	55.0
250250819001	Roxbury	906	453	53.7	53.9	54.6	54.7
250250819002	Roxbury	617	259	53.4	53.5	54.2	54.3
250250819003	Roxbury	600	257	53.3	53.4	54.2	54.2
250250819004	Roxbury	992	428	53.3	53.3	54.1	54.1
250250820001	Roxbury	1292	566	53.6	53.6	54.4	54.4

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250250820002	Roxbury	682	298	53.6	53.7	54.4	54.4
250250820003	Roxbury	841	414	53.8	53.9	54.6	54.7
250250821001	Roxbury	1228	526	53.2	53.2	53.9	54.0
250250821002	Roxbury	1553	579	52.9	52.9	53.7	53.6
250250821003	Roxbury	2244	1012	53.5	53.5	54.3	54.3
250250901001	Roxbury	1631	655	52.1	52.1	52.8	52.8
250250901002	Roxbury	531	237	51.2	51.2	51.8	51.8
250250901003	Roxbury	693	303	51.3	51.3	51.9	51.9
250250901004	Roxbury	1099	414	50.4	50.3	51.1	50.9
250250901005	Roxbury	617	249	49.9	49.9	50.5	50.5
250250902001	Roxbury	673	244	51.2	51.0	51.8	51.6
250250902002	Roxbury	626	278	51.5	51.9	52.2	52.6
250250902003	Roxbury	934	308	52.0	52.2	52.6	52.9
250250903001	Roxbury	891	333	52.3	52.1	52.9	52.7
250250903002	Roxbury	1310	513	52.8	52.3	53.5	53.0
250250903003	Roxbury	978	422	53.0	53.1	53.7	53.8
250250904001	Roxbury	871	311	53.7	53.7	54.4	54.4
250250904002	Roxbury	1155	435	53.5	53.5	54.2	54.2
250250904003	Roxbury	763	254	54.1	54.1	54.8	54.8
250250904004	Roxbury	870	294	54.5	54.5	55.2	55.2
250250906001	Roxbury	1094	351	54.8	54.8	55.6	55.6
250250906002	Roxbury	1254	442	54.8	55.0	55.6	55.7
250250914002	Roxbury	1069	355	53.0	52.9	53.6	53.5
250250924002	Roxbury	1089	417	49.2	49.2	49.7	49.8
250250924003	Roxbury	1688	711	50.3	50.2	50.9	50.8
250251203011	Roxbury	1166	443	51.0	50.8	51.9	51.7
250251203012	Roxbury	855	331	52.1	52.1	52.9	53.0
250251203014	Roxbury	1231	567	51.0	50.9	51.8	51.7
250092047011	Salem	785	328	52.7	54.3	52.4	53.9
250092047024	Salem	862	347	49.7	49.4	49.4	49.2
250173501032	Somerville	1210	520	53.1	53.3	54.1	54.2
250173501041	Somerville	2119	793	51.0	51.1	51.9	52.0
250173501042	Somerville	2584	947	51.8	51.8	52.7	52.8
250173501043	Somerville	1188	485	50.3	50.5	51.1	51.4
250173501044	Somerville	1384	673	50.6	50.6	51.5	51.6

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250173502001	Somerville	1376	586	49.6	49.7	50.5	50.5
250173502002	Somerville	603	233	48.7	48.7	49.6	49.5
250173502003	Somerville	1385	533	48.7	48.8	49.6	49.7
250173502004	Somerville	1410	594	48.7	48.7	49.6	49.6
250173502005	Somerville	749	315	49.5	49.5	50.4	50.4
250173502006	Somerville	1044	502	49.7	49.8	50.6	50.6
250173503001	Somerville	965	454	50.2	49.6	51.0	50.5
250173503002	Somerville	627	304	49.4	49.5	50.3	50.4
250173503003	Somerville	849	390	50.4	50.5	51.3	51.3
250173504001	Somerville	1006	368	51.5	51.7	52.4	52.6
250173504002	Somerville	1232	565	50.7	50.7	51.5	51.5
250173504003	Somerville	1017	462	50.0	50.1	50.8	50.9
250173504004	Somerville	1464	721	50.5	50.5	51.3	51.3
250173504005	Somerville	849	392	51.1	51.1	51.9	52.0
250173505001	Somerville	818	390	50.8	50.9	51.7	51.7
250173505002	Somerville	811	382	50.8	50.8	51.7	51.7
250173506001	Somerville	1656	2	51.3	51.3	52.2	52.2
250173506002	Somerville	939	371	50.8	50.8	51.7	51.7
250173506003	Somerville	813	231	50.5	50.6	51.4	51.5
250173506004	Somerville	1164	487	51.1	51.1	52.0	52.0
250173507001	Somerville	907	602	48.9	48.6	49.7	49.5
250173507002	Somerville	974	390	49.5	49.3	50.4	50.2
250173507003	Somerville	1007	461	50.0	50.1	50.9	51.0
250173507004	Somerville	1375	760	49.7	49.7	50.6	50.5
250173507005	Somerville	861	460	50.1	50.1	51.0	51.0
250173507006	Somerville	924	443	50.3	50.3	51.2	51.2
250173508001	Somerville	971	485	50.4	50.5	51.3	51.3
250173508002	Somerville	857	435	50.4	50.5	51.3	51.3
250173509001	Somerville	803	398	49.6	49.7	50.5	50.5
250173509002	Somerville	1209	535	49.0	49.1	49.8	49.9
250173509003	Somerville	1302	715	49.9	50.0	50.8	50.9
250173510005	Somerville	1056	484	49.0	49.1	49.8	49.9
250173514031	Somerville	763	309	49.9	49.9	50.8	50.7
250173514032	Somerville	1017	391	49.2	49.1	50.0	50.0
250173514033	Somerville	587	321	49.3	49.3	50.1	50.1

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	**Name**	**Population**	**Housing units**	**Average Block DNL**	**DNL at centroid**	**Average Block DNL**	**DNL at centroid**
250173514034	Somerville	1042	369	49.0	49.0	49.9	49.9
250173514035	Somerville	619	288	49.1	49.1	49.9	50.0
250250601011	South Boston	881	441	61.5	61.6	61.3	61.5
250250601012	South Boston	633	350	60.7	60.7	60.6	60.6
250250601013	South Boston	981	496	61.0	61.0	60.9	60.9
250250601014	South Boston	721	397	60.0	60.0	59.8	59.9
250250602001	South Boston	821	419	58.3	58.4	58.1	58.2
250250602002	South Boston	1095	580	57.4	57.1	57.3	57.0
250250603011	South Boston	1285	741	56.2	56.1	56.2	56.1
250250603012	South Boston	699	345	55.9	55.8	55.8	55.7
250250603013	South Boston	1092	561	56.5	56.3	56.5	56.4
250250604001	South Boston	1021	542	55.1	55.2	55.3	55.4
250250604002	South Boston	988	530	55.1	55.2	55.2	55.3
250250604003	South Boston	842	466	54.7	54.7	54.8	54.8
250250604004	South Boston	1093	669	54.4	54.3	54.6	54.6
250250604005	South Boston	960	336	55.3	55.2	55.7	55.6
250250605011	South Boston	699	375	57.4	57.4	57.4	57.4
250250605012	South Boston	868	508	56.4	56.5	56.6	56.6
250250605013	South Boston	717	431	56.4	56.4	56.6	56.7
250250605014	South Boston	631	295	59.2	58.9	59.1	58.8
250250605015	South Boston	656	333	56.6	56.5	56.9	56.9
250250606001	South Boston	2357	1530	58.9	62.0	59.5	62.7
250250607001	South Boston	741	253	58.1	58.1	58.8	58.8
250250607002	South Boston	1152	383	57.6	57.6	58.2	58.3
250250608001	South Boston	655	333	55.9	55.9	56.3	56.3
250250608002	South Boston	757	396	56.1	56.1	56.6	56.6
250250608003	South Boston	886	470	57.0	57.0	57.5	57.5
250250608004	South Boston	1666	943	56.4	56.6	56.9	57.2
250250610001	South Boston	1033	544	55.0	55.0	55.4	55.3
250250610002	South Boston	1164	471	54.6	54.6	55.0	54.9
250250610003	South Boston	901	393	54.7	54.4	55.1	54.8
250250611011	South Boston	617	278	53.9	54.0	54.4	54.4
250250611012	South Boston	1615	756	53.2	53.0	53.6	53.4
250250612001	South Boston	1702	1158	58.7	58.6	59.5	59.4
250250612002	South Boston	627	383	55.5	56.5	56.1	57.1

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250250612003	South Boston	911	470	54.6	54.6	55.1	55.1
250259812021	South Boston	207	0	61.9	62.5	61.9	62.4
250250703003	South End	992	707	51.9	52.1	52.7	52.9
250250703004	South End	1119	746	52.9	52.9	53.7	53.7
250250704021	South End	1723	680	54.4	55.3	55.3	56.2
250250705001	South End	1700	1018	54.4	54.4	55.2	55.2
250250705002	South End	999	524	53.4	53.4	54.2	54.3
250250705003	South End	1393	803	53.8	53.9	54.7	54.7
250250705004	South End	1368	721	53.3	53.3	54.1	54.2
250250706001	South End	1127	667	52.6	52.5	53.4	53.3
250250706002	South End	1113	642	51.9	51.9	52.7	52.7
250250707002	South End	1200	722	51.2	51.2	52.0	52.0
250250708001	South End	1594	965	51.4	51.5	52.2	52.3
250250708002	South End	1040	579	50.8	50.8	51.6	51.6
250250708001	South End	1594	965	51.4	51.5	52.2	52.3
250250708002	South End	1040	579	50.8	50.8	51.6	51.6
250250709001	South End	2166	1231	52.9	52.8	53.7	53.6
250250709002	South End	1163	567	52.4	52.4	53.2	53.3
250250711011	South End	1498	928	55.1	55.1	55.9	55.9
250250711012	South End	1424	750	54.4	55.1	55.2	55.9
250250711013	South End	831	507	54.3	54.5	55.1	55.3
250250712011	South End	1899	819	55.9	56.2	56.7	57.0
250250712012	South End	1232	578	55.2	55.4	56.1	56.3
250250805001	South End	1076	460	51.3	51.4	52.1	52.2
250250805002	South End	2020	863	52.2	52.3	53.0	53.2
250250806011	South End	3212	458	50.5	50.1	51.3	50.9
250251801011	Winthrop	1207	584	54.2	54.0	54.2	53.9
250251801012	Winthrop	1215	724	52.7	52.9	52.7	52.9
250251801013	Winthrop	2344	1194	55.3	55.8	55.2	55.7
250251802001	Winthrop	1471	610	59.7	60.1	59.6	60.0
250251802002	Winthrop	647	299	57.7	57.7	57.7	57.7
250251802003	Winthrop	648	336	59.2	59.4	59.2	59.3
250251802004	Winthrop	1343	549	61.4	63.1	61.4	63.0
250251803011	Winthrop	652	258	60.8	60.8	60.8	60.7
250251803012	Winthrop	778	322	62.1	62.1	62.1	62.2

Table H-26 2018 and 2019 DNL Levels for Census Block Group Locations within DNL 50 dB (Continued)

U.S. Census 2010 Block Group				2018		2019	
Block Group ID	Name	Population	Housing units	Average Block DNL	DNL at centroid	Average Block DNL	DNL at centroid
250251803013	Winthrop	834	351	61.4	61.7	61.6	61.8
250251803014	Winthrop	760	297	63.9	64.8	63.8	64.7
250251804001	Winthrop	876	435	58.4	57.8	58.4	57.8
250251804002	Winthrop	839	347	59.2	59.1	59.3	59.2
250251805001	Winthrop	1273	613	56.3	56.0	56.4	56.0
250251805002	Winthrop	572	271	65.0	67.0	65.1	67.2

Source: HMMH, 2020.

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Air Quality/Emissions Reduction

This appendix provides the following detailed information and data tables in support of Chapter 7, *Air Quality/Emissions Reduction*:

- Fundamentals of Air Quality
  - Table I-1 National Ambient Air Quality Standards (NAAQS)
- Sources of Airport Air Emissions
  - Table I-2 Airport-Related Sources of Air Emissions
  - Table I-3 Attainment, Nonattainment, and Maintenance Area Designations
- State Implementation Plans (SIPs)
- Aircraft Fleet and Operational Data Used in AEDT
  - Table I-4 2018 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type
  - Table I-5 2019 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type
- Ground Service Equipment (GSE)/Auxiliary Power Unit (APU) Time-in-Mode (TIM) Survey
  - Table I-6 Ground Service Equipment (GSE)/Auxiliary Power Unit (APU) Time-in-Mode (TIM) (minutes)
- Ground Service Equipment (GSE)/Alternative Fuels Conversion
  - Table I-7 Ground Service Equipment (GSE) Alternative Fuel Conversion Summary (kg/day)
- Motor Vehicle Emissions
  - Table I-8 MOVES2014b Sample Input File for 2018
  - Table I-9 MOVES2014b Sample Output File for 2018
  - Table I-10 MOVES2014b Sample Input File for 2019
  - Table I-11 MOVES2014b Sample Output File for 2019

Fundamentals of Air Quality

This section contains a general summary of air quality and air emissions with a particular emphasis on airport-related emissions where appropriate. This material is intended to supplement and provide background information for the materials contained in Chapter 7, *Air Quality/Emissions Reduction*.

Pollutant Types and Standards

The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for a select group of "criteria air pollutants" designed to protect public health, the environment, and the quality of life from the detrimental effects of air pollution. Listed alphabetically, these pollutants are briefly described below:

- **Carbon monoxide (CO)** is a colorless, odorless, tasteless gas. It may temporarily accumulate, especially in cool, calm weather conditions, when fuel use reaches a peak and CO is chemically most stable due to the low temperatures. CO from natural sources usually dissipates quickly, posing no threat to human health. Transportation sources (e.g., motor vehicles), energy generation, and open burning are among the predominant anthropogenic (i.e., man-made) sources of CO.
- **Lead (Pb)** in the atmosphere is generated from industrial sources including waste oil and solid waste incineration, iron and steel production, lead smelting, and battery and lead manufacturing. The lead content of motor vehicle emissions, which was the major source of lead in the past, has significantly declined with the widespread use of unleaded fuel. Low-lead fuel used in some general aviation (GA) aircraft is still a source of airport-related lead.
- **Nitrogen dioxide (NO_2)**, nitric oxide (NO), and the nitrate radical (NO_3) are collectively called oxides of nitrogen (NO_X). These three compounds are interrelated, often changing from one form to another in chemical reactions, and NO_2 is the compound commonly measured for comparison to the NAAQS. NO_X is generally emitted as NO, which is oxidized to NO_2. The principal man-made source of NO_X is fuel combustion in motor vehicles and power plants – aircraft engines are also a source. Reactions of NO_X with other atmospheric chemicals can lead to formation of ozone (O_3) and acidic precipitation.
- **Ozone (O_3)** is a secondary pollutant, formed from daytime reactions of NO_X and volatile organic compounds (VOCs) in the presence of sunlight. VOCs, which are a subset of hydrocarbons (HC) and have no NAAQS, are released in industrial processes and from evaporation of gasoline and solvents. Sources of NO_X are discussed above.
- **Particulate matter (PM)** comprises very small particles of dirt, dust, soot, or liquid droplets called aerosols. The NAAQS for PM is segregated by sizes (i.e., less than 10 and less than 2.5 microns as PM_{10} and $PM_{2.5}$, respectively). PM is formed as an exhaust product in the internal combustion engine or can be generated from the breakdown and dispersion of other solid materials (e.g., fugitive dust).
- **Sulfur oxides (SO_X)** are primarily composed of sulfur dioxide (SO_2) which is emitted in natural processes and by man-made sources such as combustion of sulfur-containing fuels and sulfuric acid manufacturing.

The NAAQS for these criteria air pollutants are subdivided into the Primary Standards (designed to protect human health) and the Secondary Standards (designed to protect the environment and human welfare) and are listed below in **Table I-1**. Exceedances of these values constitute violations of the NAAQS.

Table I-1 National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary/ Secondary	Averaging Time	Standard ppm	Standard µg/m³	Form
Carbon Monoxide (CO)	Primary	1-hour	35	40,000	Not to be exceeded more than once a year.
		8-hour	9	10,000	Not to be exceeded more than once a year.
Lead (Pb)	Primary and Secondary	Rolling 3-Month Average	—	0.15	Not to exceed this level. Final rule October 2008.
Nitrogen Dioxide (NO_2)	Primary	1-hour	0.100	188	The 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm.
	Primary and Secondary	Annual	0.053	100	Not to exceed this level.
Ozone (O_3)	Primary and Secondary	8-hour[1]	0.070	—	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.
Particulate Matter with a diameter ≤10µm (PM_{10})	Primary and Secondary	24-hour	—	150	Not to be exceeded more than once a year on average over 3 years.
Particulate Matter with a diameter ≤2.5µm ($PM_{2.5}$)	Primary and Secondary	24-hour	—	35	The 3-year average of the 98th percentile for each population-oriented monitor within an area is not to exceed this level.
	Primary	Annual	—	12	The 3-year average of the weighted annual mean from single or multiple monitors within an area is not to exceed this level.
	Secondary	Annual	—	15	The 3-year average of the weighted annual mean from single or multiple monitors within an area is not to exceed this level.
Sulfur Dioxide (SO_2)	Primary	1-hour	0.075	196	Final rule signed June 2, 2010. The 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed this level.
	Secondary	3-hour	0.5	1,300	Not to be exceeded more than once a year.

Source: EPA, https://www.epa.gov/criteria-air-pollutants/naaqs-table, 2020.
Note: There is no NAAQS standard for NO_X. µg/m³ - micrograms per cubic meter; ppm - parts per million.
1 Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standard additionally remains in effect in some areas. Revocation of the 2008 standard and transitioning to the new standard will be achieved over the next three years.

Sources of Airport Air Emissions

Almost all large metropolitan airports generate air emissions from the following general source categories: aircraft, auxiliary power unit (APUs), ground service equipment (GSE), and motor vehicles traveling to, from, and moving about the airport; fuel storage and transfer facilities; a variety of stationary sources (e.g., steam boilers, back-up generators, snow melters, etc.); an assortment of aircraft maintenance activities (e.g., painting, cleaning, repair, etc.); routine airfield, roadway, and building maintenance activities (e.g., painting, cleaning, repair, etc.); and periodic construction activities for new projects or improvements to existing facilities.

Table I-2 provides a summary listing of airport-related sources of air emissions, the associated pollutants, and their characteristics.

Table I-2 Airport-related Sources of Air Emissions

Sources	Emissions	Characteristics
Aircraft	CO, NO_2, PM, SO_2 and VOCs	Exhaust products of fuel combustion that vary depending on aircraft engine type, number of engines, power setting, and period of operation. Emissions are also emitted by an aircraft's auxiliary power unit (APU).
Motor vehicles	CO, NO_2, PM, SO_2 and VOCs	Exhaust products of fuel combustion from patron and employee traffic approaching, departing, and moving about the airport site. Emissions vary depending on vehicle type, distance traveled, operating speed, and ambient conditions.
Ground service equipment (GSE)	CO, NO_2, PM, SO_2 and VOCs	Exhaust products of fuel combustion from service trucks, tow tugs, belt loaders, and other portable equipment.
Fuel storage and handling	VOCs	Formed from the evaporation and vapor displacement of fuel from storage tanks and fuel handling facilities. Emissions vary with fuel usage, type of storage tank, refueling method, fuel type, vapor recovery, climate, and ambient temperature.
Stationary sources	CO, NO_2, PM, SO_2 and VOCs	Exhaust products of fossil fuel combustion from boilers dedicated to indoor heating requirements and emissions from incinerators used for waste reduction. Emissions are generally well controlled with operational techniques and post-burn collection methods. Sources include boilers and hot water generators, emergency generators, incinerators, paint booth and surface coating operations, welding operations, and firefighting facilities.

Table I-2 Airport-related Sources of Air Emissions (Continued)

Sources	Emissions	Characteristics
Construction Activities[1]	CO, NO_2, PM, SO_2 and VOCs	Construction projects may have associated emissions from dust generated during excavation and land clearing, exhaust emissions from construction equipment and motor vehicles, and evaporative emissions from asphalt paving and painting. The amount of particulate emissions varies with the material type, the amount of area exposed, and meteorology. The construction of airport and airfield improvement projects at airports represents temporary sources of emissions.

Source: KBE, 2020.
Notes: CO - carbon monoxide; NO_2 - nitrogen dioxide; PM - particulate matter; and SO_2 - sulfur dioxide; VOC - volatile organic compounds.
1 Air emissions associated with construction activities at Logan Airport were not computed for the 2018 and 2019 analyses.

EPA, state, and local air quality agencies maintain outdoor air monitoring networks to measure air quality conditions and gauge compliance with the NAAQS. Based upon the data collected by these agencies, all areas throughout the country are designated by EPA with respect to their compliance with the NAAQS. **Table I-3** provides the definitions of each of these designations.

Table I-3 Attainment, Nonattainment, and Maintenance Area Designations

Attainment	Attainment/Maintenance	Nonattainment Area	Unclassifiable
Any area that meets the National Ambient Air Quality Standards (NAAQS) established for all of the criteria air pollutants.	Any area that is in transition from formerly being a Nonattainment area to an Attainment area (also called Maintenance).	Any area that does not meet (or that contributes to ambient air quality in a nearby area that does not meet) one or more of the NAAQS.	Any area that cannot be classified on the basis of available information as meeting or not meeting the NAAQS.

Source: EPA, https://www.epa.gov/green-book, 2020.

For O_3, CO, PM_{10}, and $PM_{2.5}$, the Nonattainment designations are further classified by the severity, or degree, of the violation of the NAAQS. For example, in the case of O_3, these classifications range from highest to lowest as extreme, severe, serious, marginal, and moderate.

The Nonattainment designation of an area has a bearing on the emission control measures required and the time periods allotted by which a State Implementation Plan (SIP) must demonstrate Attainment of the NAAQS. It is also important to note that the degree of Nonattainment determines the thresholds of emissions that are considered to be "*de minimis,*" or levels below (i.e., within) which a formal General Conformity determination is not required.

Finally, the boundaries of Nonattainment areas are generally determined based on Core Based Statistical Areas (CBSA) as defined by U.S. census data (air monitoring station locations and contributing emission sources also play a role). However, Nonattainment areas for localized pollutants, such as lead and CO, typically only comprise a partial CBSA or a local "hot-spot." By comparison, regional pollutants such as O_3 can encompass multiple CBSAs and can extend across state lines.

State Implementation Plans (SIPs)

For the purposes of this summary explanation of SIPs, it is sufficient to characterize SIPs as the principal instrument by which a state formulates and implements its strategies for bringing Nonattainment or Maintenance areas into compliance with the NAAQS. In equally broad terms, the SIP contains the necessary emission limitations, control measures and timetables for achieving this objective. Therefore, the SIP development process is delegated to state air quality agencies that may in turn rely on regional, county, and local agencies to help prepare emission inventories that include airport-related emissions. A listing of the most current SIPs applicable to the Boston area are provided in Chapter 7, *Air Quality/Emissions Reduction*.

Aircraft Fleet and Operational Data used in AEDT

The Federal Aviation Administration (FAA) Aviation Environmental Design Tool (AEDT, Version 3c)[1], which is the most current, was used in support of the 2018 and 2019 air quality analyses.

Tables I-4 and **I-5** contain the data that were used in AEDT 3c to represent actual conditions at Logan Airport in 2018 and 2019, respectively. These data include aircraft type, engine type, and the number of annual landing and takeoff cycles (LTOs). The aircraft are divided into four categories: air carrier (AC), cargo (CA), commuter (CO), and general aviation (GA). Airport wide taxi/delay times of 27.27 and 28.01 minutes were assumed for 2018 and 2019, respectively. These data were obtained from the FAA Aviation System Performance Metrics (ASPM) database for each applicable year.[2]

1 FAA, Aviation Environmental Design Tool (AEDT), https://aedt.faa.gov/.

2 Federal Aviation Administration (FAA). 2017. FAA Aviation System Performance Metrics (ASPM) Database. https://aspm.faa.gov/.

Table I-4 2018 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Air Carrier Aircraft			
Embraer ERJ190-LR	CF34-10E6	29,944	AC
Airbus A320-200 Series	V2527-A5	13,657	AC
Airbus A321-100 Series	V2533-A5	12,995	AC
Boeing 737-800 Series	CFM56-7B27	10,245	AC
Airbus A320-200 Series	V2527-A5 SelectOne™ Upgrade Package	10,140	AC
Boeing 737-900-ER	CFM56-7B27E/B1	6,896	AC
Boeing 737-800 Series	CFM56-7B26	5,814	AC
Airbus A321-100 Series	CFM56-5B3/P	4,681	AC
Boeing 737-700 Series	CFM56-7B22	4,221	AC
Boeing 737-700 Series	CFM56-7B24	3,530	AC
Airbus A319-100 Series	V2522-A5	3,205	AC
Boeing 767-300 Series	PW4060	665	AC
Airbus A320-200 Series	CFM56-5A3	2,731	AC
Boeing 737-800 Series	CFM56-7B24/3	2,433	AC
Airbus A319-100 Series	CFM56-5A5	2,385	AC
Embraer ERJ190	CF34-8E5	2,344	AC
Boeing 757-200 Series	PW2037	2,268	AC
Airbus A319-100 Series	CFM56-5B6/P	1,767	AC
Boeing 717-200 Series	BR700-715C1-30	1,605	AC
Boeing 787-9 Dreamliner	Trent 1000-J3	1,561	AC
Airbus A320-200 Series	CFM56-5-A1	1,206	AC
Boeing 757-200 Series	RB211-535E4B	1,196	AC
Airbus A319-100 X/LR	V2524-A5 SelectOne™ Upgrade Package	1,113	AC
Boeing 777-300 ER	GE90-115B	986	AC
Airbus A321-200 Series	CFM56-5B3/P	903	AC
Airbus A330-300 Series	Trent 772	871	AC
Airbus A330-300 Series	CF6-80E1A4	867	AC
Boeing 737-700 Series	CFM56-7B24/3	835	AC

Table I-4 2018 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Boeing 737-900-ER	CFM56-7B26/3	745	AC
Air Carrier Aircraft (Continued)			
Boeing 737-900-ER	CFM56-7B26/3	745	AC
Airbus A320-200 Series	CFM56-5B4	682	AC
Boeing 757-200 Series	PW2040	652	AC
Airbus A320-200 Series	V2527E-A5	647	AC
Airbus A350-900 series	Trent XWB-84	633	AC
Boeing 717-200 Series	BR700-715A1-30	580	AC
Boeing 737-900 Series	CFM56-7B26	573	AC
Airbus A330-200 Series	CF6-80E1A4	558	AC
Airbus A320-200 Series	CFM56-5B4/P	549	AC
Airbus A321-NEO	CFM56-5B2/3	539	AC
Boeing 777-200 Series	GE90-85B	510	AC
Airbus A321-200 Series	CFM56-5B3/3	505	AC
Boeing 737-8	LEAP-1B28/28B2/28B1/28B3	430	AC
Boeing 737-800 Series	CFM56-7B26/3	430	AC
Embraer ERJ190-LR	CF34-10E5A1	410	AC
Airbus A330-300 Series	PW4168A	370	AC
Boeing 757-200 Series	PW2043	356	AC
Boeing 737-8	LEAP-1B27	317	AC
Boeing 737-900-ER	CFM56-7B26	311	AC
Boeing 747-8	GEnx-2B67	284	AC
Boeing 747-400 Series	RB211-524H-T	278	AC
Airbus A340-600 Series	Trent 556-61	245	AC
Airbus A320-200 Series	CFM56-5B3/3	244	AC
Boeing 737-800 Series	CFM56-7B24	228	AC
Boeing 737-800 Series	CFM56-7B27E/B1	222	AC
Boeing 777-200 Series	PW4090	198	AC
Airbus A330-200 Series	CF6-80E1A3	196	AC
Boeing MD-90	V2525-D5	189	AC
Airbus A340-300 Series	CFM56-5C4	178	AC

Table I-4 2018 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Boeing 767-200 Series Freighter	JT9D-7R4D, -7R4D1	174	AC
Air Carrier Aircraft (Continued)			
Airbus A320-NEO	PW1127G-JM	169	AC
Boeing 777-200 Series	Trent 895	156	AC
Boeing 757-200 Series Freighter	RB211-535E4	146	AC
Boeing 777-200 Series	GE90-76B	142	AC
Boeing MD-88	JT8D-219	138	AC
Boeing 737-700 Series	CFM56-7B20	131	AC
Boeing 737-700 Series	CFM56-7B26	128	AC
Airbus A319-100 X/LR	CFM56-5B7/3	127	AC
Airbus A340-300 Series	CFM56-5C4/P	127	AC
Boeing 757-200 Series	RB211-535E4	109	AC
Airbus A319-100 Series	CFM56-5B3/3	104	AC
Boeing 757-200 Series Freighter	PW2040	102	AC
Airbus A319-100 X/LR	V2527-A5M SelectOne™ Upgrade Package	102	AC
Airbus A319-100 Series	CFM56-5B6/3	93	AC
Boeing 787-8 Dreamliner	GENX-1B64	90	AC
Airbus A380-800 Series	Trent 970-84	89	AC
Boeing 767-200 Series	CF6-80C2B7F	87	AC
Boeing 757-300 Series	RB211-535E4B	82	AC
Airbus A319-100 Series	V2527-A5	74	AC
Airbus A330-200 Series	CF6-80E1A2	68	AC
Boeing MD-90	V2528-D5	66	AC
Airbus A321-200 Series	CFM56-5B1	64	AC
Airbus A320-200 Series	CFM56-5B4/3	63	AC
Boeing 777-200-ER	GE90-94B	63	AC
Boeing 737-400 Series	CFM56-3C-1	61	AC
Airbus A330-200 Series	Trent 772	53	AC
Boeing 777-200-ER	GE90-90B	50	AC
Airbus A320-200 Series	V2522-D5	46	AC
Boeing 787-8 Dreamliner	Trent 1000-CE3	43	AC

Table I-4 2018 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Airbus A330-300 Series	CF6-80E1A2	38	AC
Air Carrier Aircraft (Continued)			
Airbus A320-NEO	LEAP-1A26/26E1	36	AC
Airbus A310-300 Series	CF6-80C2A2	31	AC
Boeing 747-400 Series	RB211-524G-T	28	AC
Boeing 767-300 Series	PW4060	25	AC
Boeing MD-11 Freighter	PW4062	14	AC
Airbus A330-200 Series	PW4168A	13	AC
Boeing 767-400	CF6-80C2B8F	13	AC
Airbus A319-100 Series	CFM56-5B4/2P	12	AC
Airbus A320-200 Series	V2527-A5E SelectOne™ Upgrade Package	9	AC
Boeing 757-300 Series	RB211-535E4B	8	AC
Boeing 737-800 Series	CFM56-7B27/3	8	AC
Boeing 737-700 Series	CFM56-7B27	7	AC
Boeing 757-300 Series	PW2040	7	AC
Boeing MD-81	JT8D-219	5	AC
Boeing 777-200 Series	GE90-90B	4	AC
Boeing 777-200 Series	Trent 892	3	AC
Boeing 737-700 Series	CFM56-7B27/3	3	AC
Airbus A380-800 Series	GP7270	2	AC
Boeing 747-400 ER	CF6-80C2B5F	1	AC
Antonov 124 Ruslan	JT9D-7Q	1	AC
Airbus A320-200 Series	CFM56-5B4/2P	1	AC
Boeing DC-9-10 Series	JT8D-9 series	1	AC
Airbus A340-200 Series	CFM56-5C4	1	AC
Airbus A319-100 Series	CFM56-5B7/P	1	AC
Boeing 737-300 Series	CFM56-3C-1	1	AC
Airbus A330-300 Series	PW4158	1	AC
Boeing 737-700 Series	CFM56-7B26/3	1	AC
Boeing 747-8F	GEnx-2B67	1	AC
Boeing 737-600 Series	CFM56-7B22	1	AC

Table I-4	2018 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type		
Aircraft Type	**Engine**	**LTOs**	**Description**
Airbus A320-NEO	PW1127GA-JM	1	AC
Air Carrier Aircraft (Continued)			
Boeing 747-400 Series	CF6-80C2B1F	1	AC
Boeing 727-100 Series	JT8D-17R	1	AC
Boeing 727-200 Series	JT8D-17R	1	AC
Boeing C-17A	PW2041	1	AC
Total Air Carrier Aircraft LTOs		**146,352**	
Cargo Aircraft			
Boeing 767-300 Series	CF6-80C2B6F	2,380	CA
Airbus A300B4-600 Series	PW4158	631	CA
Airbus A300F4-600 Series	CF6-80C2A5F	327	CA
Boeing MD-11 Freighter	CF6-80C2D1F	72	CA
Boeing MD-10-1 Freighter	CF6-6D	68	CA
Airbus A300F4-600 Series	CF6-80C2A5	37	CA
Boeing MD-11 Freighter	PW4060	20	CA
Boeing MD-10-30	CF6-50C2	12	CA
Boeing 767-300 Series	CF6-80C2B6F	4	CA
Boeing 757-200 Series Freighter	PW2037	2	CA
Boeing 767-200 Series Freighter	CF6-80A	2	CA
Boeing 747-400 Series Freighter	CF6-80C2B1F	1	CA
Total Cargo Aircraft LTOs		**3,556**	
Commuter Aircraft			
Cessna 402	TIO-540-J2B2	17,879	CO
Bombardier CRJ-900	CF34-8C5	5,786	CO
Embraer ERJ175	CF34-8E5	3,562	CO
Bombardier de Havilland Dash 8 Q400	PW150A	2,517	CO
Embraer ERJ175	CF34-8E5A1	2,287	CO
Bombardier CRJ-200	CF34-3B	2,247	CO
Bombardier CRJ-700	CF34-8C1	1,695	CO

Table I-4	2018 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type		
Aircraft Type	**Engine**	**LTOs**	**Description**
Embraer ERJ140-LR	AE3007A1/3	1,686	CO
Commuter Aircraft (Continued)			
Embraer ERJ170	CF34-8E5	1,654	CO
DeHavilland DHC-8-200	PW150A	1,644	CO
Embraer ERJ175-LR	CF34-8E5	1,051	CO
Embraer ERJ170-LR	CF34-8E5	646	CO
Bombardier CRJ-900	CF34-8C5A1	615	CO
Embraer ERJ145-LR	AE3007A1P	544	CO
Embraer ERJ145-LR	AE3007A1	491	CO
Embraer ERJ145-LR	AE3007A	339	CO
Embraer ERJ145-XR	AE3007A1E	190	CO
Bombardier CRJ-900-ER	CF34-8C5A1	141	CO
Bombardier CRJ-705-LR	CF34-8C5	73	CO
Bombardier de Havilland Dash 8 Q300	PW123	67	CO
Bombardier CRJ-700	CF34-8C5	41	CO
Bombardier CRJ-700	CF34-8C5B1	30	CO
Bombardier de Havilland Dash 8 Q100	PW120A	5	CO
Bombardier Challenger 850	CF34-3B	1	CO
Total Commuter Aircraft LTOs		**45,191**	
General Aviation Aircraft			
Pilatus PC-12	PT6A-67	1,070	GA
Pilatus PC-12	PT6A-67B	853	GA
Cessna 560 Citation Excel	JT15D-5, -5A, -5B	816	GA
Bombardier Challenger 350	HTF7350 (AS907-2-1A)	777	GA
Embraer 505	PW530	746	GA
Dassault Falcon 2000	PW308C Build Spec 1289	625	GA
Saab 340-B	CT7-9B	614	GA
Raytheon Super King Air 300	PT6A-67A	598	GA
Bombardier Challenger 300	HTF7350 (AS907-2-1A)	500	GA
Cessna 680-A Citation Latitude	PW306B	480	GA

Table I-4 2018 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Raytheon Beechjet 400	JT15D-5, -5A, -5B	450	GA
General Aviation Aircraft (Continued)			
Cessna 525 CitationJet	PW4090	391	GA
Cessna 560 Citation XLS	PW306B	380	GA
Gulfstream G350	TAY 611-8C	367	GA
Cirrus SR22	TIO-540-J2B2	352	GA
Raytheon Hawker 800	TFE731-2/2A	330	GA
Cessna 750 Citation X	AE3007C1	327	GA
Gulfstream G500	BR700-710C4-11	325	GA
Bombardier Challenger 600	CF34-3A1	309	GA
Cessna 680 Citation Sovereign	PW306B	293	GA
Bombardier Global Express	BR700-710A2-20	278	GA
Gulfstream G650	BR700-725A1-12	240	GA
Raytheon Super King Air 200	PT6A-41	231	GA
Sikorsky S-76 Spirit	T700-GE-700	226	GA
Cessna 208 Caravan	PT6A-114	213	GA
Bombardier Global 5000 Business	BR700-710A2-20	206	GA
Kaman SH-2 Seasprite	T700-GE-401 -401C	199	GA
Bombardier Learjet 60	PW306A	198	GA
Dassault Falcon 900-EX	TFE731-2/2A	178	GA
Gulfstream IV-SP	TAY Mk611-8	152	GA
Cessna 525C CitationJet	PW610F	141	GA
Cessna 680 Citation Sovereign	PW308C Build Spec 1289	132	GA
Piper PA-32 Cherokee Six	TIO-540-J2B2	131	GA
Saab 340-A	CT7-9B	131	GA
Bombardier Challenger 605	CF34-3B	123	GA
Raytheon Beech Baron 58	TIO-540-J2B2	116	GA
Raytheon Beech 99	TPE331-6	116	GA
Dassault Falcon 50-EX	TFE731-2/2A	106	GA
Bombardier Learjet 35	TFE731-3	105	GA
Bombardier Learjet 35	TFE731-2-2B	105	GA

Table I-4 2018 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Embraer Legacy 450 (EMB-545)	HTF7500E (AS907-3-1E-A3)	104	GA
General Aviation Aircraft (Continued)			
Bombardier Learjet 45	TFE731-2/2A	102	GA
Cessna 182	IO-360-B	97	GA
Raytheon Hawker 800	TFE731-3	96	GA
Piper PA-34 Seneca	TSIO-360C	94	GA
Gulfstream G280	HTF7250G (AS907-2-1G)	90	GA
Raytheon Beech Bonanza 36	TIO-540-J2B2	88	GA
Gulfstream G450	TAY Mk611-8	87	GA
Cessna 750 Citation X	PW308A	85	GA
Cessna S550 Citation S/II	PW610F	82	GA
Bombardier Learjet 45	TFE731-2-2B	78	GA
Gulfstream G550	BR700-710A1-10	76	GA
Gulfstream G200	TFE731-2/2A	75	GA
Falcon 7X	PW307A	72	GA
Cessna 414	TIO-540-J2B2	68	GA
Bombardier Challenger 604	CF34-3B	66	GA
Bombardier Global 6000 Business	BR700-710A2-20	64	GA
Gulfstream G150	TFE731-3	59	GA
Gulfstream G500	BR700-710A1-10	50	GA
Raytheon Hawker 4000 Horizon	PW308A	49	GA
Honda HA-420 Hondajet	PW610F	48	GA
Bombardier Learjet 75	TFE731-3	48	GA
Bombardier Challenger 300	HTF7000 (AS907-1-1A)	40	GA
Cessna 560 Citation V	JT15D-5, -5A, -5B	39	GA
Cessna 560 Citation V	PW530	38	GA
Embraer ERJ135-LR	AE3007A1/3	37	GA
Cessna 421 Piston	IO-360-B	37	GA
Bombardier Challenger 601	CF34-3A	37	GA
Cessna 525 CitationJet	JT15D-1 series	36	GA
Dassault Falcon 900-EX	TFE731-3	34	GA

Table I-4 2018 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Embraer 500	HTF7500E (AS907-3-1E-A3)	32	GA
General Aviation Aircraft (Continued)			
Cessna 560 Citation V	JT15D-5C	31	GA
Eurocopter AS 355NP	250B17B	30	GA
Piper PA-28 Cherokee Series	IO-320-D1AD	29	GA
Piper PA-27 Aztec	TIO-540-J2B2	28	GA
Piper PA-31 Navajo	TIO-540-J2B2	28	GA
Bell 407 / Rolls-Royce 250-C47B	250B17B	27	GA
Piper PA46 Meridian	TIO-540-J2B2	27	GA
Raytheon Hawker 1000	PW306A	26	GA
Mooney M20-K	TSIO-360C	25	GA
Embraer Legacy 500 (EMB-550)	HTF7500E (AS907-3-1E-A3)	24	GA
Cessna 650 Citation III	TFE731-2/2A	23	GA
Eurocopter EC-T2 (CPDS)	TPE331-3	23	GA
EADS Socata TBM-700	PT6A-64	23	GA
Cessna 208 Caravan	TPE331-12B	23	GA
Bombardier Learjet 31	TFE731-3	23	GA
Bell 429	TPE331-1	23	GA
Cessna 210 Centurion	TIO-540-J2B2	22	GA
Dassault Falcon 100	TFE731-3	22	GA
Pilatus PC-24	PW610F	22	GA
Cessna 206	TIO-540-J2B2	21	GA
Raytheon Premier I	PW308C Build Spec 1289	20	GA
Embraer ERJ135 Legacy Business	AE3007A1E	20	GA
Gulfstream G200	PW306A	19	GA
Cessna 172 Skyhawk	O-320	18	GA
Dassault Falcon 50-EX	TFE731-3	17	GA
Aerospatiale SA-350D Astar (AS-350)	TPE331-3	16	GA
Cessna 182 R (FAS)	IO-360-B	16	GA
Raytheon Beech 99	PT6A-28	16	GA
Bombardier Learjet 55	TFE731-3	16	GA

Table I-4 2018 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Piper PA-31T Cheyenne	PT6A-135A	15	GA
General Aviation Aircraft (Continued)			
Robinson R44 Raven / Lycoming O-540-F1B5	TIO-540-J2B2	14	GA
Cessna 340	TIO-540-J2B2	14	GA
Gulfstream G100	TFE731-2/2A	14	GA
Gulfstream V-SP	BR700-710A1-10	13	GA
Eclipse 500 / PW610F	PW610F	12	GA
Cirrus SR20	IO-360-B	12	GA
Piper PA46-TP Meridian	PT6A-42	12	GA
Dassault Falcon 8X	PW307D	12	GA
Dornier 328 Jet	PW306B	11	GA
Piaggio P.180 Avanti	PT6A-60	10	GA
Agusta A-109	250B17B	10	GA
Bombardier Learjet 40	TFE731-2/2A	9	GA
Bell 206 JetRanger	250B17B	9	GA
Aerostar PA-60	TIO-540-J2B2	8	GA
Dassault Falcon 200	TFE731-3	7	GA
Cessna 441 Conquest II	TPE331-10UK	7	GA
Embraer ERJ135 Legacy Business	AE3007A1P	7	GA
SOCATA TBM 850	PT6A-66	6	GA
Eurocopter EC-130	TPE331-3	6	GA
Piper PA-28 Cherokee Series	O-320	6	GA
Bombardier Learjet 36	TFE731-2-2B	5	GA
Bombardier Learjet 45-XR	TFE731-2-2B	5	GA
CESSNA CITATION 510	PW610F	5	GA
Beech 95 (FAS)	TIO-540-J2B2	5	GA
Piper PA-24 Comanche	TIO-540-J2B2	5	GA
Gulfstream III (FAS)	SPEY Mk511	5	GA
Cessna 310	TIO-540-J2B2	4	GA
Raytheon Beech 60 Duke	PT6A-36	4	GA
Eurocopter EC-155B1	T400-CP-400	4	GA

Table I-4 2018 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Gulfstream II-B	SPEY Mk511	3	GA
General Aviation Aircraft (Continued)			
Gulfstream G100	TFE731-3	3	GA
Raytheon Beech 1900-D	PT6A-67D	3	GA
Cessna 335/340 (FAS)	TIO-540-J2B2	3	GA
Dassault Falcon 20-F	CF700-2D	3	GA
Raytheon King Air 100	TPE331-6	3	GA
Bell 430	250B17B	2	GA
Raytheon Beech 55 Baron	TIO-540-J2B2	2	GA
Cessna 500 Citation I	PW530	2	GA
Gulfstream Aerospace Gulfstream G500 (G-7)	PW814GA	2	GA
Gulfstream G600	PW815GA	2	GA
Piaggio P.180 Avanti	PT6A-66	2	GA
Beechcraft 76 Duchess	TIO-540-J2B2	2	GA
Dornier 328-100 Series	PW119B	2	GA
Grumman AA-5A/B (FAS)	O-320	2	GA
Raytheon Super King Air 300	PT6A-60A	2	GA
Mitsubishi MU-2	TPE331-5A	2	GA
Israel IAI-1124-A Westwind II	TFE731-3	2	GA
Rockwell Commander 690	TPE331-3	2	GA
Bombardier Challenger 601	CF34-3A1	1	GA
Dassault Falcon 20-D	CF700-2D	1	GA
Raytheon Beech 99	PT6A-36	1	GA
Bell 427	TPE331-1	1	GA
Cessna 170 (FAS)	IO-360-B	1	GA
Cessna Aircraft Company 180F	IO-360-B	1	GA
Cessna 501 Citation ISP	PW610F	1	GA
Cessna 700 Citation Longitude	HTF7000 (AS907-1-1A)	1	GA
Diamond DA40	IO-360-B	1	GA
Diamond DA42 Twin Star	IO-360-B	1	GA
Lancair Evolution (FAS)	TIO-540-J2B2	1	GA

Table I-4 2018 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Gulfstream American GA-7 Cougar (FAS)	O-320	1	GA
General Aviation Aircraft (Continued)			
Bombardier Learjet 24-XR	CJ610-2C	1	GA
Maule MT-7-235	TIO-540-J2B2	1	GA
Ryan Navion F	TIO-540-J2B2	1	GA
Fairchild SA-227-AC Metro III	PW125B	1	GA
Bombardier Learjet 70	TFE731-3	1	GA
Total General Aviation Aircraft LTOs		**16,913**	
Total Fleet LTOs		**212,012**	

Source: KBE and HMMH, 2020.
Notes: LTOs – landing and takeoff cycles; AC – Air carrier; CA – Cargo; CO – commuter; and GA – general aviation.

Table I-5 2019 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Air Carrier Aircraft			
Embraer ERJ190-LR	CF34-10E6	32,468	AC
Airbus A321-100 Series	V2533-A5	15,262	AC
Airbus A320-200 Series	V2527-A5	14,630	AC
Airbus A320-200 Series	V2527-A5 SelectOne™ Upgrade Package	9,101	AC
Boeing 737-800 Series	CFM56-7B27	7,922	AC
Airbus A321-100 Series	CFM56-5B3/P	6,490	AC
Boeing 737-800 Series	CFM56-7B26	5,533	AC
Boeing 737-900-ER	CFM56-7B27E/B1	5,291	AC
Boeing 737-700 Series	CFM56-7B22	3,423	AC
Airbus A319-100 Series	V2522-A5	3,065	AC
Boeing 757-200 Series	PW2037	3,052	AC
Boeing 737-700 Series	CFM56-7B24	2,859	AC
Embraer ERJ190	CF34-8E5	2,598	AC
Boeing 757-200 Series	RB211-535E4B	2,163	AC
Airbus A319-100 Series	CFM56-5B6/P	2,026	AC
Airbus A320-200 Series	CFM56-5A3	1,907	AC
Boeing 737-800 Series	CFM56-7B24/3	1,852	AC
Airbus A319-100 Series	CFM56-5A5	1,849	AC
Boeing 717-200 Series	BR700-715C1-30	1,503	AC
Airbus A330-300 Series	Trent 772	1,400	AC
Boeing 777-300 ER	GE90-115B	976	AC
Boeing 787-9 Dreamliner	GEnx-1B76A/P2	932	AC
Airbus A330-300 Series	CF6-80E1A4	884	AC
Airbus A320-200 Series	CFM56-5-A1	881	AC
Embraer ERJ190-LR	CF34-10E5A1	835	AC
Airbus A320-200 Series	CFM56-5B4	781	AC
Boeing 787-9 Dreamliner	Trent 1000-J3	744	AC
Boeing 737-700 Series	CFM56-7B24/3	731	AC
Airbus A319-100 X/LR	V2524-A5 SelectOne™ Upgrade Package	728	AC

Table I-5 2019 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Air Carrier Aircraft (Continued)			
Airbus A321-NEO	CFM56-5B2/3	696	AC
Airbus A320-200 Series	CFM56-5B4/P	668	AC
Boeing 757-200 Series	PW2040	667	AC
Airbus A321-200 Series	CFM56-5B3/P	663	AC
Airbus A320-200 Series	V2527E-A5	599	AC
Boeing 767-300 Series	PW4060	570	AC
Boeing 717-200 Series	BR700-715A1-30	543	AC
Boeing 777-200 Series	GE90-85B	507	AC
Boeing 737-900-ER	CFM56-7B26/3	461	AC
Boeing 737-800 Series	CFM56-7B26/3	458	AC
Airbus A320-NEO	LEAP-1A26/26E1	402	AC
Airbus A330-300 Series	PW4168A	376	AC
Airbus A320-200 Series	CFM56-5B3/3	373	AC
Airbus A330-200 Series	CF6-80E1A4	366	AC
Airbus A340-600 Series	Trent 556-61	312	AC
Airbus A320-NEO	PW1127G-JM	308	AC
Boeing 737-900 Series	CFM56-7B26	292	AC
Boeing 757-300 Series	RB211-535E4B	290	AC
Airbus A330-200 Series	PW4168A	282	AC
Boeing 777-200 Series	Trent 895	272	AC
Boeing 737-900-ER	CFM56-7B26	272	AC
Boeing 737-8	LEAP-1B28/28B2/28B1/28B3	266	AC
Airbus A350-900 series	Trent XWB-84	251	AC
Airbus A340-300 Series	CFM56-5C4	238	AC
Airbus A330-300 Series	CF6-80E1A2	224	AC
Airbus A330-200 Series	CF6-80E1A3	224	AC
Airbus A330-200 Series	Trent 772	215	AC
Boeing 747-8	GEnx-2B67	208	AC
Boeing 777-200 Series	GE90-76B	204	AC
Airbus A380-800 Series	Trent 970-84	201	AC

Table I-5 2019 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Air Carrier Aircraft (Continued)			
Boeing 757-200 Series	PW2043	200	AC
Airbus A320-200 Series	V2522-D5	200	AC
Airbus A321-200 Series	CFM56-5B3/3	186	AC
Boeing 777-200-ER	GE90-90B	179	AC
Boeing 737-800 Series	CFM56-7B24	174	AC
Boeing 777-200-ER	GE90-94B	169	AC
Airbus A380-800 Series	GP7270	160	AC
Airbus A319-100 Series	CFM56-5B3/3	152	AC
Airbus A321-200 Series	CFM56-5B1	137	AC
Boeing 747-400 Series	RB211-524H-T	137	AC
Airbus A330-900N Series (Neo)	Trent7000-72C	135	AC
Boeing 767-200 Series	CF6-80C2B7F	133	AC
Boeing 757-200 Series	RB211-535E4	131	AC
Boeing 767-200 Series Freighter	JT9D-7R4D, -7R4D1	131	AC
Airbus A340-300 Series	CFM56-5C4/P	126	AC
Boeing 747-400 Series	CF6-80C2B1F	124	AC
Boeing 787-8 Dreamliner	Trent 1000-CE3	121	AC
Boeing 737-8	LEAP-1B27	116	AC
Boeing 787-8 Dreamliner	GENX-1B64	109	AC
Boeing 737-700 Series	CFM56-7B26	106	AC
Airbus A319-100 X/LR	V2527-A5M SelectOne™ Upgrade Package	82	AC
Airbus A320-200 Series	CFM56-5B4/3	79	AC
Boeing 737-700 Series	CFM56-7B20	79	AC
Airbus A319-100 Series	CFM56-5B6/3	77	AC
Boeing 757-200 Series Freighter	RB211-535E4	72	AC
Boeing 737-400 Series	CFM56-3C-1	63	AC
Boeing 737-800 Series	CFM56-7B27E/B1	56	AC
Boeing 767-400	CF6-80C2B8F	51	AC
Airbus A319-100 X/LR	CFM56-5B7/3	44	AC
Boeing MD-11 Freighter	CF6-80C2D1F	44	AC

Table I-5 2019 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Air Carrier Aircraft (Continued)			
Airbus A319-100 Series	V2527-A5	37	AC
Boeing MD-10-30	CF6-50C2	32	AC
Boeing 757-200 Series Freighter	PW2040	20	AC
Boeing 747-400 Series	RB211-524G-T	19	AC
Boeing 757-300 Series	RB211-535E4B	18	AC
Boeing 777-200 Series	PW4090	16	AC
Airbus A320-200 Series	V2527-A5E SelectOne™ Upgrade Package	15	AC
Boeing 737-9	LEAP-1B28/28B2/28B1/28B3	13	AC
Boeing 767-300 Series	PW4060	10	AC
Boeing 737-700 Series	CFM56-7B27/3	9	AC
Boeing MD-11 Freighter	PW4062	8	AC
Boeing 737-700 Series	CFM56-7B27	5	AC
Boeing 787-10 Dreamliner	Trent 1000-N3	4	AC
Boeing 777-200-LR	GE90-110B1	4	AC
Boeing MD-88	JT8D-219	4	AC
Boeing 777-200 Series	Trent 892	4	AC
Boeing 737-800 Series	CFM56-7B27/3	3	AC
Boeing MD-90	V2525-D5	3	AC
Airbus A330-200 Series	CF6-80E1A2	3	AC
Airbus A319-100 Series	CFM56-5B4/2P	3	AC
Boeing 777-200 Series	GE90-90B	3	AC
Airbus A320-NEO	PW1127GA-JM	3	AC
Boeing MD-90	V2528-D5	2	AC
Airbus A340-500 Series	Trent 556-61	2	AC
Boeing 767-300 Series	CF6-80C2B6	2	AC
Boeing 757-300 Series	PW2040	2	AC
AIRBUS A-400M	TYNE	1	AC
Embraer ERJ190	CF34-10E7-B	1	AC
Boeing 747-8F	GEnx-2B67	1	AC
Boeing 757-200 Series Freighter	PW2037	1	AC

Table I-5 2019 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
Air Carrier Aircraft (Continued)			
Boeing 737-300 Series Freighter	CFM56-3C-1	1	AC
Boeing 747-400 Series Freighter	PW4056	1	AC
Boeing MD-83	JT8D-219	1	AC
Boeing MD-81	JT8D-219	1	AC
Boeing C-17A	PW2041	1	AC
Boeing 767-300 Series	PW4x52	1	AC
Boeing 727-100 Series	JT8D-17R	1	AC
Total Air Carrier Aircraft LTOs		**147,122**	
Cargo Aircraft			
Boeing 767-300 Series	CF6-80C2B6F	2,726	CA
Airbus A300B4-600 Series	PW4158	681	CA
Airbus A300F4-600 Series	CF6-80C2A5F	370	CA
Boeing MD-10-1 Freighter	CF6-6D	40	CA
Airbus A300F4-600 Series	CF6-80C2A5	25	CA
Boeing MD-11 Freighter	PW4060	9	CA
Boeing 767-300 Series	CF6-80C2B6F	2	CA
Boeing 747-SP	RB211-524D4	1	CA
Boeing 737-200 Series	JT8D-17AR	1	CA
Total Cargo Aircraft LTOs		**3,855**	
Commuter Aircraft			
Cessna 402	TIO-540-J2B2	17,718	CO
Bombardier CRJ-900	CF34-8C5	5,650	CO
Embraer ERJ175	CF34-8E5	5,387	CO
Embraer ERJ170	CF34-8E5	3,999	CO
Bombardier de Havilland Dash 8 Q400	PW150A	2,760	CO
Embraer ERJ175-LR	CF34-8E5	2,501	CO
Embraer ERJ175	CF34-8E5A1	2,008	CO
Embraer ERJ170-LR	CF34-8E5	1,640	CO

Table I-5	2019 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type		
Aircraft Type	**Engine**	**LTOs**	**Description**
Commuter Aircraft (Continued)			
DeHavilland DHC-8-200	PW150A	1,065	CO
Embraer ERJ145-LR	AE3007A1	895	CO
Bombardier CRJ-200	CF34-3B	809	CO
Bombardier CRJ-705-LR	CF34-8C5	763	CO
Embraer ERJ145-LR	AE3007A	594	CO
Bombardier CS100	PW1524G	527	CO
Embraer ERJ140-LR	AE3007A1/3	195	CO
Bombardier CRJ-700	CF34-8C1	136	CO
Bombardier de Havilland Dash 8 Q300	PW123	92	CO
Embraer ERJ145-LR	AE3007A1P	90	CO
Embraer ERJ145-XR	AE3007A1E	18	CO
Bombardier CRJ-700	CF34-8C5B1	14	CO
Bombardier CRJ-700	CF34-8C5	7	CO
Bombardier Challenger 850	CF34-3B	3	CO
Dassault Falcon 20-F	CF700-2D	3	CO
DeHavilland DHC-8-100	PW123	2	CO
Bombardier (Canadair) CRJ200 ExecLiner	CF34-3A1	2	CO
Bombardier Learjet 36	TFE731-2-2B	2	CO
Total Commuter Aircraft LTOs		**46,880**	
General Aviation Aircraft			
Pilatus PC-12	PT6A-67	1,190	GA
Pilatus PC-12	PT6A-67B	941	GA
Bombardier Challenger 350	HTF7350 (AS907-2-1A)	844	GA
Embraer 505	PW530	804	GA
Cessna 680-A Citation Latitude	PW306B	767	GA
Cessna 560 Citation Excel	JT15D-5, -5A, -5B	692	GA
Raytheon Super King Air 300	PT6A-67A	552	GA
Bombardier Challenger 300	HTF7350 (AS907-2-1A)	529	GA
Dassault Falcon 2000	PW308C Build Spec 1289	518	GA

Table I-5 2019 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
General Aviation Aircraft (Continued)			
Gulfstream G350	TAY 611-8C	374	GA
Cessna 560 Citation XLS	PW306B	347	GA
Cirrus SR22	TIO-540-J2B2	338	GA
Gulfstream G500	BR700-710C4-11	331	GA
Raytheon Beechjet 400	JT15D-5, -5A, -5B	326	GA
Cessna 525 CitationJet	PW4090	302	GA
Raytheon Hawker 800	TFE731-2/2A	299	GA
Bombardier Global Express	BR700-710A2-20	287	GA
Cessna 750 Citation X	AE3007C1	278	GA
Bombardier Challenger 600	CF34-3A1	271	GA
Cessna 680 Citation Sovereign	PW306B	266	GA
Cessna 208 Caravan	PT6A-114	217	GA
Kaman SH-2 Seasprite	T700-GE-401 -401C	217	GA
Saab 340-B	CT7-9B	208	GA
Gulfstream G650	BR700-725A1-12	203	GA
Raytheon Super King Air 200	PT6A-41	186	GA
Sikorsky S-76 Spirit	T700-GE-700	175	GA
Embraer Legacy 450 (EMB-545)	HTF7500E (AS907-3-1E-A3)	169	GA
Dassault Falcon 900-EX	TFE731-2/2A	167	GA
Bombardier Global 5000 Business	BR700-710A2-20	157	GA
Raytheon Beech Baron 58	TIO-540-J2B2	152	GA
Cessna 525C CitationJet	PW610F	146	GA
Bombardier Learjet 60	PW306A	142	GA
Gulfstream IV-SP	TAY Mk611-8	135	GA
Bombardier Challenger 605	CF34-3B	133	GA
Gulfstream G280	HTF7250G (AS907-2-1G)	127	GA
Piper PA-32 Cherokee Six	TIO-540-J2B2	112	GA
Cessna 680 Citation Sovereign	PW308C Build Spec 1289	106	GA
Dassault Falcon 50-EX	TFE731-2/2A	106	GA
Raytheon Hawker 800	TFE731-3	104	GA

Table I-5 2019 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
General Aviation Aircraft (Continued)			
Raytheon Beech 99	TPE331-6	102	GA
Cessna 750 Citation X	PW308A	91	GA
Bombardier Learjet 35	TFE731-2-2B	90	GA
Pilatus PC-24	PW610F	83	GA
Piper PA-34 Seneca	TSIO-360C	83	GA
Falcon 7X	PW307A	83	GA
Bombardier Learjet 45	TFE731-2/2A	74	GA
Bombardier Global 6000 Business	BR700-710A2-20	72	GA
Bombardier Learjet 35	TFE731-3	66	GA
Gulfstream G500	BR700-710A1-10	63	GA
Bombardier Learjet 75	TFE731-3	60	GA
Gulfstream G200	TFE731-2/2A	59	GA
Cessna S550 Citation S/II	PW610F	56	GA
Raytheon Beech Bonanza 36	TIO-540-J2B2	56	GA
Cessna 182	IO-360-B	55	GA
Bombardier Challenger 604	CF34-3B	52	GA
Piper PA-31 Navajo	TIO-540-J2B2	51	GA
Cessna 525 CitationJet	JT15D-1 series	44	GA
Cessna 414	TIO-540-J2B2	42	GA
Gulfstream G450	TAY Mk611-8	42	GA
Gulfstream G150	TFE731-3	40	GA
Embraer Legacy 500 (EMB-550)	HTF7500E (AS907-3-1E-A3)	39	GA
Honda HA-420 Hondajet	PW610F	37	GA
Gulfstream G550	BR700-710A1-10	36	GA
Embraer 500	HTF7500E (AS907-3-1E-A3)	34	GA
Cessna 421 Piston	IO-360-B	34	GA
Raytheon Hawker 1000	PW306A	33	GA
Eurocopter AS 355NP	250B17B	32	GA
Bombardier Learjet 45	TFE731-2-2B	32	GA
Raytheon Hawker 4000 Horizon	PW308A	29	

Table I-5 2019 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
General Aviation Aircraft (Continued)			
Piper PA46 Meridian	TIO-540-J2B2	26	GA
Dassault Falcon 900-EX	TFE731-3	26	GA
Eurocopter EC-T2 (CPDS)	TPE331-3	25	GA
Piper PA-28 Cherokee Series	IO-320-D1AD	25	GA
Cessna 650 Citation III	TFE731-2/2A	25	GA
Bell 407 / Rolls-Royce 250-C47B	250B17B	24	GA
Cessna 560 Citation V	JT15D-5C	24	GA
Gulfstream G100	TFE731-2/2A	22	GA
Cessna 172 Skyhawk	O-320	22	GA
Bombardier Challenger 601	CF34-3A	22	GA
Bell 429	TPE331-1	22	GA
Robinson R44 Raven / Lycoming O-540-F1B5	TIO-540-J2B2	22	GA
Gulfstream G200	PW306A	22	GA
Bombardier Learjet 31	TFE731-3	20	GA
Bombardier Challenger 300	HTF7000 (AS907-1-1A)	20	GA
Bombardier Learjet 40	TFE731-2/2A	19	GA
Embraer ERJ135-LR	AE3007A1/3	18	GA
Bombardier Learjet 55	TFE731-3	16	GA
Cessna 208 Caravan	TPE331-12B	15	GA
Piper PA-27 Aztec	TIO-540-J2B2	15	GA
Raytheon Beech 99	PT6A-28	15	GA
Mooney M20-K	TSIO-360C	15	GA
Cessna 210 Centurion	TIO-540-J2B2	15	GA
Piper PA-31T Cheyenne	PT6A-135A	13	GA
Piper PA-24 Comanche	TIO-540-J2B2	13	GA
Cirrus SR20	IO-360-B	13	GA
Cessna 560 Citation V	JT15D-5, -5A, -5B	13	GA
Cessna 182 R (FAS)	IO-360-B	12	GA
Eurocopter EC-130	TPE331-3	11	GA
Embraer ERJ135 Legacy Business	AE3007A1E	11	GA

Table I-5 2019 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
General Aviation Aircraft (Continued)			
Bombardier Learjet 45-XR	TFE731-2-2B	11	GA
Piper PA-28 Cherokee Series	O-320	10	GA
Bell 206 JetRanger	250B17B	10	GA
Bombardier Learjet 70	TFE731-3	10	GA
Eclipse 500 / PW610F	PW610F	9	GA
Beech 95 (FAS)	TIO-540-J2B2	9	GA
Raytheon Premier I	PW308C Build Spec 1289	9	GA
Gulfstream G100	TFE731-3	9	GA
Dassault Falcon 8X	PW307D	7	GA
Piaggio P.180 Avanti	PT6A-60	7	GA
Gulfstream III (FAS)	SPEY Mk511	7	GA
Cessna 340	TIO-540-J2B2	7	GA
Bombardier Challenger 601	CF34-3A1	7	GA
Agusta A-109	250B17B	7	GA
Gulfstream Aerospace Gulfstream G500 (G-7)	PW814GA	6	GA
DAHER TBM 900/930	PT6A-66	6	GA
Eurocopter EC-155B1	T400-CP-400	6	GA
Dassault Falcon 100	TFE731-3	6	GA
Dassault Falcon 50-EX	TFE731-3	6	GA
Raytheon Beech 55 Baron	TIO-540-J2B2	6	GA
Cessna 185 Skywagon	IO-360-B	5	GA
Cessna 206	TIO-540-J2B2	5	GA
SOCATA TBM 850	PT6A-66	5	GA
Gulfstream V-SP	BR700-710A1-10	5	GA
EADS Socata TBM-700	PT6A-64	5	GA
Piper PA46-TP Meridian	PT6A-42	5	GA
Cessna 310	TIO-540-J2B2	5	GA
Cessna 177 (FAS)	IO-360-B	4	GA
Embraer ERJ135 Legacy Business	AE3007A1P	4	GA
Cessna 500 Citation I	PW530	4	GA

Table I-5 2019 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
General Aviation Aircraft (Continued)			
Bell 430	250B17B	4	GA
Piper PA-23 Apache/Aztec	TIO-540-J2B2	4	GA
Dassault Falcon 200	TFE731-3	3	GA
Diamond DA40	IO-360-B	3	GA
Aerospatiale SA-350D Astar (AS-350)	TPE331-3	3	GA
Cessna 560 Citation V	PW530	3	GA
Israel IAI-1124-A Westwind II	TFE731-3	3	GA
Raytheon King Air 100	TPE331-6	3	GA
Piper PA-42 Cheyenne Series	TPE331-14B	3	GA
Raytheon Super King Air 300	PT6A-60A	3	GA
Dornier 328 Jet	PW306B	3	GA
Aerostar PA-60	TIO-540-J2B2	3	GA
Dassault Falcon 20-D	CF700-2D	2	GA
Grumman AA-5A/B (FAS)	O-320	2	GA
CIRRUS SF-50 Vision	PW610F	2	GA
Cessna Aircraft Company 180F	IO-360-B	2	GA
Mitsubishi MU-2	TPE331-5A	2	GA
Rockwell Commander 690	TPE331-3	2	GA
Raytheon Beech 99	PT6A-36	2	GA
Saab 2000	PW127-A	2	GA
Fairchild SA-227-AC Metro III	PW125B	2	GA
Lockheed C-130 Hercules	T56 series III	2	GA
Hughes 500D	250B17B	2	GA
Bombardier CS300	PW1524G	1	GA
Diamond DV-20 Katana (FAS)	O-320	1	GA
Cessna 303 Crusader (FAS)	TIO-540-J2B2	1	GA
DeHavilland DHC-6-100 Twin Otter	PT6A-65R	1	GA
Cessna 501 Citation ISP	PW610F	1	GA
CESSNA CITATION 510	PW610F	1	GA
Gulfstream G600	PW815GA	1	GA

Table I-5 2019 Fleet Mix and Annual Landing and Takeoff Cycles (LTOs) by Aircraft Type

Aircraft Type	Engine	LTOs	Description
General Aviation Aircraft (Continued)			
Bombardier Global 7000 Business	BIZMEDIUMJET_F	1	GA
Cessna 425 Conquest I	PT6A-135A	1	GA
Bell 427	TPE331-1	1	GA
Bombardier Learjet 24-XR	CJ610-2C	1	GA
Piper PA-30 Twin Comanche	IO-320-D1AD	1	GA
Mitsubishi MU-300 Diamond	JT15D-5, -5A, -5B	1	GA
Cessna 150 Series	O-200	1	GA
Embraer EMB120 Brasilia	PW118B	1	GA
Cessna 441 Conquest II	TPE331-10UK	1	GA
Antonov 12 Cub	T56 series I	1	GA
Rockwell Commander 500	TIO-540-J2B2	1	GA
Rockwell Sabreliner 65	TFE731-3	1	GA
Raytheon Beech 1900-D	PT6A-67D	1	GA
Total General Aviation Aircraft LTOs		**15,731**	
Total Fleet LTOs		**213,588**	

Source: KBE and HMMH, 2020.
Notes: LTOs – landing and takeoff cycles; AC – Air carrier; CA – Cargo; CO – commuter; and GA – general aviation.

Ground Service Equipment (GSE)/Auxiliary Power Unit (APU) Time-in-Mode (TIM) Survey

The most recent GSE/APU time-in-mode (TIM) survey conducted at Logan Airport was performed on June 27-28, 2017, and was used in support of the *2018/2019 EDR* as well as the *2017 Environmental Status and Planning Report (ESPR)*. The purpose of a GSE/APU TIM survey is to provide up-to-date operating times, which directly affects GSE/APU emissions. The survey prior to the 2017 TIM survey was conducted in 2012 in support of the *2011 ESPR*.

The TIM is the average time that GSE and APUs operate during a single aircraft LTO cycle. The surveyed TIM is used in place of the default TIM values in AEDT, thus yielding emissions that best reflect the conditions at Logan Airport. The 2017 TIM survey focused on the most prevalent airlines (e.g., Southwest, JetBlue, American, Delta, and United) and the most common aircraft t types, such as narrow body air carriers (e.g., A320, A321, B737, B757, etc.) and large commuter aircraft (e.g., ERJ170, ERJ190, CRJ700, CRJ900, etc.). The TIMs are provided in **Table I-6** for GSE and APUs.

Table I-6 Ground Service Equipment (GSE)/Auxiliary Power Unit (APU) Time-in-Mode (TIM) (minutes)

Source	Narrow-Body Air Carriers	Large Commuter Aircraft
Aircraft Tractor	6.37	7.13
Baggage Tractor	27.23	17.43
Belt Loader	26.85	14.88
Cabin Service Truck	2.07	0.53
Catering Truck	11.30	13.28
Hydrant Truck	3.73	2.53
Lavatory Truck	4.82	2.45
Service Truck	0.12	0.57
Water Service Truck	1.65	0.75
APUs	16.63	14.70

Source: GSE TIM survey conducted by KBE with assistance from Massport (security escorts) on June 27-28, 2017.
Note: APUs – auxiliary power units.

Furthermore, APU operating times for wide body air carriers, small commuter aircraft and GA aircraft were assumed to have a TIM of 8.9 minutes per LTO. This data was based on the TIM survey conducted at Logan Airport in 2012. Cargo aircraft APU TIM data was based on AEDT defaults (i.e., 26 minutes per LTO).

Ground Service Equipment (GSE) Alternative Fuels Conversion

For the 2018 and 2019 analyses, GSE emissions were calculated using AEDT emission factors in combination with the 2017 TIM survey and the GSE fuel types obtained from the 2018 and 2019 Logan Airport Vehicle Aerodrome Permit Applications. In this way, the most up-to-date GSE fleet operational and fuel mix characteristics (including alternative fuels and electric-powered GSE) are used. **Table I-7** presents the emission reductions of criteria air pollutants/precursor pollutants due to the use of GSE alternative fueled vehicles (AVFs) from 2000 to 2019.

Table I-7 Ground Service Equipment (GSE) Alternative Fuel Conversion Summary (kg/day)

Year	Pollutant	Percent Reduction	Emissions without Reduction	Reduction from AFVs	Emissions with Reduction
2000	VOCs	13.72%	178	24	154
	NO_X	9.87%	369	36	333
	CO	12.88%	6,124	789	5,335
2001	VOCs	13.72%	166	23	143
	NO_X	9.87%	338	33	305
	CO	12.88%	5,960	768	5,193
2002	VOCs	13.6%	286	39	247
	NO_X	8.0%	350	28	322
	CO	16.3%	6,174	1,004	5,170
2003	VOCs	13.8%	263	36	227
	NO_X	8.0%	316	25	291
	CO	16.4%	5,692	934	4,758
2004	VOCs	11.9%	212	25	187
	NO_X	6.6%	357	24	333
	CO	15.4%	4,236	650	3,586
2005	VOCs	12.2%	203	25	178
	NO_X	6.9%	335	23	312
	CO	15.4%	4,175	643	3,531
	$PM_{10}/PM_{2.5}$	9.9%	11	1	10

Table I-7	Ground Service Equipment (GSE) Alternative Fuel Conversion Summary (kg/day)				
Year	Pollutant	Percent Reduction	Emissions without Reduction	Reduction from AFVs	Emissions with Reduction
2006	VOCs	10.7%	86	9	77
	NO_X	7.5%	324	24	300
	CO	13.8%	1,841	255	1,586
	$PM_{10}/PM_{2.5}$	10.8%	10	1	9
2007	VOCs	8.2%	85	7	78
	NO_X	5.1%	315	16	299
	CO	10.4%	2,124	220	1,904
	$PM_{10}/PM_{2.5}$	5.9%	10	<1	10
2008	VOCs	8.3%	72	6	66
	NO_X	4.8%	270	13	257
	CO	10.2%	1,792	183	1,609
	$PM_{10}/PM_{2.5}$	5.6%	16	<1	15
2009	VOCs	8.2%	61	5	56
	NO_X	4.8%	230	11	219
	CO	10.0%	1,516	152	1,364
	$PM_{10}/PM_{2.5}$	3.5%	14	<1	14
2010	VOCs	7.5%	53	4	49
	NO_X	3.9%	206	8	198
	CO	8.5%	1,335	113	1,222
	$PM_{10}/PM_{2.5}$	2.5%	13	<1	13
2011	VOCs	13.2%	38	5	33
	NO_X	7.5%	188	14	173
	CO	16.7%	834	139	694
	$PM_{10}/PM_{2.5}$	5.5%	14	1	13

Table I-7 Ground Service Equipment (GSE) Alternative Fuel Conversion Summary (kg/day)

Year	Pollutant	Percent Reduction	Emissions without Reduction	Reduction from AFVs	Emissions with Reduction
2012	VOCs	11.8%	34	4	30
	NO_X	6.8%	176	12	164
	CO	16.3%	738	120	618
	$PM_{10}/PM_{2.5}$	4.9%	13	<1	13
2013	VOCs	10.3%	29	3	26
	NO_X	6.5%	155	10	145
	CO	15.9%	634	101	533
	$PM_{10}/PM_{2.5}$	5.0%	12	<1	12
2014	VOCs	11.5%	26	3	23
	NO_X	5.6%	142	8	134
	CO	15.4%	572	88	484
	$PM_{10}/PM_{2.5}$	4.8%	12	<1	12
2015	VOCs	4.5%	22	1	21
	NO_X	5.2%	135	7	128
	CO	15.2%	521	79	442
	$PM_{10}/PM_{2.5}$	14.3%	14	2	12
2016	VOCs	9.0%	26	2	24
	NO_X	3.8%	173	6	167
	CO	13.5%	560	67	493
	$PM_{10}/PM_{2.5}$	2.6%	15	<1	15
2017	VOCs	8.7%	24	2	22
	NO_X	3.6%	148	5	143
	CO	13.7%	548	66	483
	$PM_{10}/PM_{2.5}$	3.8%	14	<1	14

Table I-7 Ground Service Equipment (GSE) Alternative Fuel Conversion Summary (kg/day)

Year	Pollutant	Percent Reduction	Emissions without Reduction	Reduction from AFVs	Emissions with Reduction
2018	VOCs	8.0%	23	2	21
	NO_X	3.1%	154	5	149
	CO	12.3%	487	60	428
	$PM_{10}/PM_{2.5}$	2.0%	14	<1	14
2019	VOCs	6.6%	22	1	21
	NO_X	2.5%	152	4	148
	CO	11.5%	449	52	397
	$PM_{10}/PM_{2.5}$	1.7%	14	<1	14

Source: KBE and Massport, 2020.
Notes: CO - carbon monoxide; NO_X - nitrogen oxides; $PM_{10}/PM_{2.5}$ - PM_{10} is particulate matter 10 micrometers or less in diameter, $PM_{2.5}$ is particulate matter 2.5 micrometers or less in diameter; and VOC - volatile organic compounds. AFVs – alternative fuel vehicles. The 2000 and 2001 analyses used EDMS v4.03. The 2002 and 2003 analyses used EDMS v4.11, which used updated emission factors from the NONROAD2002 Model. The 2004 analysis used EDMS v4.21, which again used emission factors from EPA NONROAD2002 Model. The 2005 analysis used EDMS v4.5, which used emission factors from EPA NONROAD2002 Model. The 2006 analysis used EDMS v5.0.1, which used emission factors from EPA NONROAD2005 Model. The 2007 analysis used EDMS v5.0.2, which used emission factors from EPA NONROAD2005 Model. The 2008 analysis used EDMS v5.1, which used emission factors from EPA NONROAD2005 Model. The 2009 analysis used EDMS v5.1.2, which used emission factors from EPA NONROAD2005 Model. The 2010, 2011, and 2012 analyses used EDMS v5.1.3, which used emission factors from EPA NONROAD2005 Model. The 2013, 2014, 2015 analyses used EDMS v5.1.4.1, which used emission factors from EPA NONROAD2005. The 2016 analysis used AEDT2c SP2, which used emission factors from EPA NONROAD2008 Model. The 2017 analysis used AEDT 2d, which used emission factors from EPA NONROAD2008 Model. The 2018 and 2019 analysis used AEDT 3c, which used emission factors from EPA MOVES2014b.

Motor Vehicle Emissions

For the 2018 and 2019 analyses, EPA's most current motor vehicle emission factor model MOVES (i.e., MOVES, Version 2014b)[3] was used. The resultant emission factors were multiplied by average daily vehicle miles traveled (VMT) to calculate daily emissions. The on-Airport traffic data are summarized in the VMT analyses of Appendix G, *Ground Access to and from Logan Airport.*[4] Further, MOVES was used to obtain vehicle emissions at idle to estimate parking and curbside motor vehicle emissions. Idling emissions are determined for a unit of time and multiplied by total idling time to reach the associated emissions. The 2018 and 2019 MOVES input/output files used in the emissions inventories are included as **Tables I-8** and **I-9**, and **Tables I-10** and **I-11**, respectively**.**

3 U.S. Environmental Protection Agency, MOVES Emissions Model, http://www.epa.gov/otaq/models/moves/.
4 Due to the new roadway configuration of the Ted Williams Tunnel, through-traffic no longer traverses Airport property. Therefore, as of 2003, emissions from these vehicles are no longer included as part of the Logan Airport emissions inventory.

Table I-8 MOVES2014b Sample Input File for 2018


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Source: KBE and Massport, 2020.

Table I-9 MOVES2014b Sample Output File for 2018

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mi
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mi
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mi
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mi
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mi
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mi
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mi
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mi
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g,mi
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mi

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mi
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Source: KBE and Massport, 2020.

Table I-10 MOVES2014b Sample Input File for 2019


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	<modeldomain value="PROJECT"/>
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	</geographicselections>
	<timespan>
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		<day id="5"/>
		<beginhour id="7"/>
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	</timespan>
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		<onroadvehicleselection fueltypeid="5" fueltypedesc="Ethanol (E-85)" sourcetypeid="31" sourcetypename="Passenger Truck"/>
		<onroadvehicleselection fueltypeid="1" fueltypedesc="Gasoline" sourcetypeid="21" sourcetypename="Passenger Car"/>
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	<offroadvehiclesccs>
	</offroadvehiclesccs>
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		<pollutantprocessassociation pollutantkey="98" pollutantname="CO2 Equivalent" processkey="1" processname="Running Exhaust"/>
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Source: KBE and Massport, 2020.

Table I-11 MOVES2014b Sample Output File for 2019

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21875,g,mi
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978534698486,g,mi
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21415278315544,g,mi
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1323999953456223,g,mi
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26670092344284,g,mi
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99853515625,g,mi

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2526122331619,g,mi
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8543243408,g,mi
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98681640625,g,mi
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434688091278,g,mi

Source: KBE and Massport, 2020.

Fuel Storage and Handling

As in previous years, VOC emissions from fuel storage and handling were calculated using methods based on EPA's AP-42[5] document. Calculations account for evaporative emissions from breathing losses, working losses, and spillage from aboveground storage tanks, underground storage tanks, and aircraft refueling. **Table I-12** presents the fuel storage and handling fuel throughputs by fuel category used in the analyses.

Stationary Sources

Stationary source emissions include the Central Heating and Cooling Plant, emergency generators, snow melters, space heaters, boilers and those associated with the fire training facility. Emission factors from EPA's AP-42 and/or NO_X Reasonably Available Control Technology (RACT) compliance testing were combined with the actual 2018 and 2019 fuel throughputs of the stationary sources to obtain emissions of VOCs, NO_X, CO, and PM_{10}/$PM_{2.5}$. Notably, in 2003, additional information became available on the type of fire training fuel used at Logan Airport (i.e., Tek Flame®). Emissions from these activities were calculated using default emission factors from AEDT and actual annual fuel usages.

Title V of the 1990 Clean Air Act (CAA) Amendments requires facilities with air emissions to document their emissions and obtain a single permit combining all sources. The permitting program ensures that all emission sources are accounted for, the proper permits have been received, and permit conditions are being followed. A Title V Air Operating Permit covers all of the stationary sources at Logan Airport including boilers, emergency generators, snow melters, fire training, cooling towers, paint booths, deicing facilities, and storage tanks. **Table I-13** presents Logan Airport’s stationary sources fuel throughputs by fuel category.

5 EPA, Compilation of Air Pollutant Emission Factors, AP-42, https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors.

Table I-12 Fuel Storage and Handling Fuel Throughputs by Fuel Category (gallons)

Fuel Category	1999	2000	2001	2002	2003	2004	2005
Jet Fuel	354,095,516	441,901,932	416,748,819	358,190,362	319,439,910	373,996,141	368,645,392
Aviation Gas	99,726	90,922	60,691	35,111	32,515	34,717	52,487
Auto Gas	7,200,000	7,569,206	6,181,472	5,754,740	5,436,322	5,803,442	5,903,424
Diesel	768,106	839,751	1,239,904	1,067,847	1,030,185	1,078,665	1,567,688
Heating Oil No. 2	480,733	494,500	582,283	340,492	370,903	381,852	367,899
Heating Oil No. 6	1,600,893	1,555,527	1,641,693	1,079,283	1,122,975	2,940,752	3,098,126

Fuel Category	2006	2007	2008	2009	2010	2011	2012
Jet Fuel	364,450,864	367,585,187	345,631,788	327,358,619	335,693,997	340,421,373	343,731,127
Aviation Gas	35,098	29,067	25,037	18,238	15,268	14,064	12,306
Auto Gas	6,028,931	6,022,237	5,693,178	5,736,724	5,696,505	5,487,952	6,694,626
Diesel	1,164,493	1,141,335	1,071,707	1,121,241	1,168,761	1,099,720	878,499
Heating Oil No. 2	259,768	423,181	303,143	409,049	319,727	384,906	210,794
Heating Oil No. 6	1,396,529	1,073,260	16,385	368,690	9,010	11,285	6,786

Fuel Category	2013	2014	2015	2016	2017	2018	2019
Jet Fuel	349,397,940	370,222,342	374,985,216	456,003,328	484,310,931	507,833,269	542,314,657
Aviation Gas	14,422	12,514	10,225	10,654	11,075	8,559	7,608
Auto Gas	6,800,936	7,007,591	7,432,165	7,794,957	7,737,865	6,739,001	7,411,444
Diesel	1,094,714	1,178,805	1,473,720	1,233,200	1,272,828	1,404,583	1,270,852
Heating Oil No. 2	289,665	289,956	294,704	520,977	213,279	25,664	20,000
Heating Oil No. 6[1]	17,721	77,146	0	0	0	0	0

Source: Massport, 2020.

1 Effective November 2014, Massport no longer uses No. 6 heating oil at the Central Heating and Cooling Plant as it was replaced with No. 2 heating oil.

Table I-13 Stationary Source Fuel Throughputs by Fuel Category (gallons)

Fuel Category	1999	2000	2001	2002	2003	2004	2005
Natural Gas (ft^3)	183,943,000	283,720,049	199,500,000	268,359,282	201,714,114	62,610,000	92,460,000
Heating Oil No. 2	480,733	494,500	582,283	340,492	370,903	381,852	367,899
Heating Oil No. 6[1]	1,600,893	1,555,527	1,641,693	1,079,283	1,122,975	2,940,752	3,098,126
Diesel Fuel[2]	57,441	N/A	N/A	N/A	N/A	67,198	77,848
Fire Training Fuel[3]	23,000	N/A	N/A	N/A	13,719	12,227	8,105

Fuel Category	2006	2007	2008	2009	2010	2011	2012
Natural Gas (ft^3)	112,390,000	338,430,000	458,680,000	430,810,000	449,640,000	479,830,000	360,523,000
Heating Oil No. 2	259,768	423,181	303,143	409,050	319,727	384,906	210,794
Heating Oil No. 6[1]	1,396,529	1,073,260	16,385	368,690	9,010	11,285	6,786
Diesel Fuel[2]	77,848	258,606	146,718	145,778	116,511	218,081	42,109
Fire Training Fuel[3]	5,000	8,631	5,971	3,510	800	3,810	2,587

Fuel Category	2013	2014	2015	2016	2017	2018	2019
Natural Gas (ft^3)	402,496,000	418,805,000	463,170,000	429,502,000	491,356,303	422,549,485	515,029,176
Heating Oil No. 2	289,665	289,956	294,704	520,977	115,878	25,664	52,491
Heating Oil No. 6[1]	17,721	77,146	0	0	0	0	0
Diesel Fuel[2]	231,130	124,480	381,581	90,850	157,243	220,928	165,208
Fire Training Fuel[3]	5,400	3,753	7,619	6,153	5,211	7,366	7,375

Source: Massport, 2020.
N/A Not available.
1 Effective November 2014, Massport no longer uses No. 6 heating oil at the Central Heating and Cooling Plant as it was replaced with No. 2 heating oil.
2 Diesel fuel was from the stationary snow melter usage. Starting in 2007, portable snow melter usage was also included. Starting in 2018 and 2019 emergency generators usage was also included.
3 Fire training fuel used in 1999-2002 was Jet A Fuel while in 2003 through 2015 it was Tek-Flame®. Starting in 2012 AvGas usage was also included. In 2018 and 2019 AvGas usage amounts to 1,159 gallons and 1,001 gallons, respectively.

1993 – 2009 Criteria Air Pollutant Emissions Inventories

Tables I-14 and **I-15** present the estimated VOC emissions for Logan Airport for the years 1993 through 2001 and 2002 through 2009, respectively. The emissions inventories from 2010 to 2019 are presented in *Chapter 7, Air Quality/Emissions Reduction*.

Table I-14 Estimated VOC Emissions (kg/day) at Logan Airport 1993-2001[1]

Aircraft/GSE Model:	**Logan Dispersion Modeling System (LDMS)**					**EDMS v3.22**	**EDMS v4.21**	**EDMS v4.03**	
Motor Vehicle Model:	**MOBILE5a**					**MOBILE 5a_h**	**MOBILE 6.2.03**	**MOBILE 6.0**	
Year:	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999[2]**	**2000**	**2001**
Aircraft Sources									
Air carriers	1,958	1,554	1,407	1,390	1,227	736	653	514	374
Commuter aircraft	943	543	531	622	498	154	196	140	113
Cargo aircraft	89	244	236	214	207	43	318	207	149
General aviation	51	48	36	24	27	13	141	42	43
Total aircraft sources	3,041	2,389	2,210	2,250	1,959	946	1,308	903	679
Ground Support Equipment[3]	636	533	521	497	530	145	243	153	143
Motor Vehicles									
Ted Williams Tunnel through-traffic	N/A	N/A	N/A	N/A	N/A	N/A	15	12	10
Parking/curbside	173	148	127	102	102	118	101	89	77
On-airport vehicles[4]	238	215	179	223	205	258	256	206	170
Total motor vehicle sources	411	363	306	325	307	376	372	307	257
Other Sources									
Fuel storage/handling	408	434	318	356	381	372	352	412	372
Miscellaneous sources[5]	5	5	5	6	6	2	16	2	2
Total other sources	413	439	323	362	387	374	368	414	374
Total Airport Sources	**4,501**	**3,724**	**3,360**	**3,434**	**3,183**	**1,841**	**2,291**	**1,777**	**1,453**

Source: KBE and Massport. 2020.
Notes: GSE – ground service equipment; N/A - not available; VOC – volatile organic compound.
kg/day Kilograms per day. One kg/day is approximately equivalent to 0.40234 tons per year (tpy).
1 The emissions inventory for 1990 is shown in Chapter 7, *Air Quality/Emissions Reduction*. Emission inventories for 1991 and 1992 were not prepared.
2 Year 1999 emissions were last re-calculated using EDMS v4.21 in the *2004 ESPR* Air Quality Analysis.
3 Beginning in 1996 and later, emissions include vehicles and equipment converted to alternative fuels. Auxiliary power unit (APU) emissions are also included.
4 1999 emissions inventory include reductions attributable to compressed natural gas (CNG) shuttle buses.
5 Includes the Central Heating and Cooling Plant, emergency electricity generation, and other stationary sources. Fire training emissions were included in 1999. Diesel snow melter usage was added in 1999.

Table I-15 Estimated VOC Emissions (kg/day) at Logan Airport 2002-2009

Aircraft/GSE Model:	**EDMS v4.11**		**EDMS v4.21**	**EDMS v4.5**		**EDMS v5.0.1**		**EDMS v5.0.2**		**EDMS v5.1**		**EDMS v5.1.2**
Motor Vehicle Model:	**MOBILE 6.0**	**MOBILE 6.2.01**	**MOBILE 6.2.03**									
Year:	**2002**	**2003**	**2004**	**2005**	**2006**		**2007**		**2008**		**2009**	
Aircraft Sources												
Air carriers	248	208	292	271	227	511	435	381	324	286	237	235
Commuter aircraft	75	95	127	140	125	371	479	409	253	176	131	133
Cargo aircraft	127	94	110	41	19	46	129	112	107	70	71	71
General aviation	52	61	127	147	147	236	226	206	201	171	78	78
Total aircraft sources	502	458	656	599	518	1,164[1]	1,269	1,108	885	703	517	517
Ground Support Equipment[2]	247	227	187	178	167	77	78	78	66	66	56	56
Motor Vehicles												
Ted Williams Tunnel through-traffic[3]	9	0	0	0	0	0	0	0	0	0	0	0
Parking/curbside[4]	51	45	38	37	33	33	31	31	25	25	22	22
On-airport vehicles	152	135	129	118	106	106	104	104	82	82	71	71
Total motor vehicle sources	212	180	167	155	139	139	135	135	107	107	93	93
Other Sources												
Fuel storage/handling	329	297	341	340	336	336	338	338	320	320	307	307
Miscellaneous sources[5]	2	3	9	13	8	8	14	14	13	12	7	7
Total other sources	331	300	350	353	344	344	352	352	333	332	314	314
Total Airport Sources	**1,292**	**1,165**	**1,360**	**1,285**	**1,168**	**1,724**	**1,834**	**1,673**	**1,391**	**1,208**	**980**	**980**

Source: KBE and Massport, 2020.
Notes: GSE – ground service equipment; VOC – volatile organic compound.
Years 2006 to 2009 were computed with previous years EDMS version to provide for a common basis of comparison.
Kg/day Kilograms per day. One kg/day is equivalent to approximately 0.40234 tons per year (tpy).
1 The 2006 increase in aircraft VOC emissions is largely attributable to the addition of aircraft main engine startup emissions.
2 GSE emissions include aircraft auxiliary power units (APUs) as well as vehicles and equipment converted to alternative fuels.
3 Due to the new roadway configuration and opening of the Ted Williams Tunnel there was no Ted Williams Tunnel through-traffic at Logan Airport beginning in 2003.
4 Parking/curbside is based on vehicle miles traveled (VMT) analysis.
5 Includes the Central Heating and Cooling Plant, emergency electricity generation, snow melter usage, and other stationary sources.

Tables I-16 and **I-17** present the estimated NO_X emissions for Logan Airport for the years 1993 through 2001 and 2002 through 2009, respectively. The emissions inventories from 2010 to 2019 are presented in *Chapter 7, Air Quality/Emissions Reduction*.

Table I-16 Estimated NO_X Emissions (kg/day) at Logan Airport 1993-2001[1]

Aircraft/GSE Model:	**Logan Dispersion Modeling System (LDMS)**					**EDMS v3.22**	**EDMS v4.21**	**EDMS v4.03**	
Motor Vehicle Model:	**MOBILE5a**					**MOBILE 5a_h**	**MOBILE 6.2.03**	**MOBILE 6.0**	
Year:	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999[2]**	**2000**	**2001**
Aircraft Sources									
Air carriers	4,271	4,317	3,861	3,781	4,150	4,471	4,183	4,202	3,707
Commuter aircraft	202	158	192	137	159	203	166	125	233
Cargo aircraft	213	257	332	363	262	254	286	284	267
General aviation	13	13	17	18	21	5	12	49	34
Total aircraft sources	4,699	4,745	4,402	4,299	4,592	4,933	4,647	4,660	4,241
Ground Support Equipment[3]	722	617	607	588	622	317	444	333	305
Motor Vehicles									
Ted Williams Tunnel through-traffic	N/A	N/A	N/A	N/A	N/A	N/A	28	26	22
Parking/curbside	25	24	24	24	24	37	39	52	46
On-airport vehicles[4]	240	239	229	257	244	372	449	425	369
Total motor vehicle sources	265	263	253	281	268	409	516	503	437
Other Sources									
Fuel storage/handling[5]	0	0	0	0	0	0	0	0	0
Miscellaneous sources[6]	278	330	320	275	244	284	165	211	185
Total other sources	278	330	320	275	244	284	165	211	185
Total Airport Sources	**5,964**	**5,955**	**5,582**	**5,443**	**5,726**	**5,943**	**5,772**	**5,707**	**5,168**

Source: KBE and Massport, 2020.
Notes: GSE – ground service equipment; N/A – not available; NO_X – oxides of nitrogen.
Kg/day Kilograms per day. One kg/day is approximately equivalent to 0.40234 tons per year (tpy).
1 The emissions inventory for 1990 is shown in Chapter 7, *Air Quality/Emissions Reduction*. Emission inventories for 1991 and 1992 were not prepared.
2 Year 1999 emissions were last re-calculated using EDMS v4.21 in the 2004 ESPR Air Quality Analysis.
3 Beginning in 1996 and later, emissions include vehicles and equipment converted to alternative fuels. Auxiliary power unit (APU) emissions are also included.
4 1999 emissions inventory include reductions attributable to compressed natural gas (CNG) shuttle buses.
5 Fuel storage and handling facilities are not sources of NO_X emissions.
6 Includes the Central Heating and Cooling Plant, emergency electricity generation, and other stationary sources. Fire training emissions were included in 1999. Diesel snow melter usage was added in 1999.

Table I-17 Estimated NO_X Emissions (kg/day) at Logan Airport 2002-2009

Aircraft/GSE Model:	EDMS v4.11		EDMS v4.21	EDMS v4.5		EDMS v5.0.1		EDMS v5.0.2		EDMS v5.1		EDMS v5.1.2
Motor Vehicle Model:	**MOBILE 6.0**	**MOBILE 6.2.01**	**MOBILE 6.2.03**									
Year:	**2002**	**2003**	**2004**	**2005**	**2006**		**2007**		**2008**		**2009**	
Aircraft Sources												
Air carriers	2,721	2,479	2,949	2,880	2,849	3,044	3,120	3,121	3,031	3,031	2,944	2,952
Commuter aircraft	208	185	245	225	195	256	353	354	319	319	309	234
Cargo aircraft	246	213	215	211	192	125	248	248	233	233	215	204
General aviation	38	45	49	50	49	60	56	56	43	43	27	23
Total aircraft sources	3,213	2,922	3,458	3,366	3,285	3,485	3,777	3,779	3,626	3,626	3,495	3,413
Ground Support Equipment[1]	322	291	333	312	280	300	299	299	257	257	219	219
Motor Vehicles												
Ted Williams Tunnel through-traffic[2]	20	0	0	0	0	0	0	0	0	0	0	0
Parking/curbside[3]	32	28	21	22	19	19	18	18	15	15	13	13
On-airport vehicles	341	302	267	269	238	238	233	233	182	182	153	153
Total motor vehicle sources	393	330	288	291	257	257	251	251	197	197	166	166
Other Sources												
Fuel storage/handling[4]	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous sources[5]	175	151	211	218	109	109	128	128	124	124	181	181
Total other sources	175	151	211	218	109	109	128	128	124	124	181	181
Total Airport Sources	**4,103**	**3,694**	**4,290**	**4,187**	**3,931**	**4,151**	**4,455**	**4,457**	**4,204**	**4,204**	**4,061**	**3,979**

Source: KBE and Massport, 2020.

Notes: GSE – ground service equipment; NO_X – oxides of nitrogen.
Years 2006 to 2009 were computed with previous years EDMS version to provide for a common basis of comparison.

Kg/day Kilograms per day. One kg/day is approximately equivalent to 0.40234 tons per year (tpy).

1 GSE emissions include auxiliary power units (APUs) as well as vehicles and equipment converted to alternative fuels.

2 Due to the new roadway configuration and opening of the Ted Williams Tunnel there was no Ted Williams Tunnel through-traffic at Logan Airport beginning in 2003.

3 Parking/curbside data is based on vehicle miles traveled (VMT) analysis.

4 Fuel storage/handling facilities are not a source of NO_X emissions.

5 Includes the Central Heating and Cooling Plant, emergency electricity generation, snow melter usage, and other stationary sources.

Tables I-18 and **I-19** present the estimated CO emissions for Logan Airport for the years 1993 through 2001 and 2002 through 2009, respectively. The emissions inventories from 2010 to 2019 are presented in *Chapter 7, Air Quality/Emissions Reduction*.

Table I-18 Estimated CO Emissions (kg/day) at Logan Airport 1993-2001[1]

Aircraft/GSE Model:	**Logan Dispersion Modeling System (LDMS)**					**EDMS v3.22**	**EDMS v4.21**	**EDMS v4.03**	
Motor Vehicle Model:	**MOBILE5a**					**MOBILE 5a_h**	**MOBILE 6.2.03**	**MOBILE 6.0**	
Year:	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999[2]**	**2000**	**2001**
Aircraft Sources									
Air carriers	5,663	4,660	4,691	4,812	4,698	3,079	3,754	2,994	2,475
Commuter aircraft	1,309	927	934	859	770	482	1,404	1,188	1,072
Cargo aircraft	344	572	598	580	514	218	503	400	323
General aviation	353	356	339	549	654	269	940	295	407
Total aircraft sources	7,669	6,515	6,562	6,800	6,636	4,048	6,601	4,877	4,277
Ground Support Equipment[3]	7,482	6,187	6,029	5,740	6,098	5,113	4,532	5,335	5,193
Motor Vehicles									
Ted Williams Tunnel through-traffic	N/A	N/A	N/A	N/A	N/A	N/A	151	133	121
Parking/curbside	952	820	650	644	586	772	437	495	440
On-airport vehicles[4]	1,575	1,451	1,087	1,514	1,283	1,883	2,547	2,245	2,001
Total motor vehicle sources	2,527	2,271	1,737	2,158	1,869	2,655	3,135	2,873	2,562
Other Sources									
Fuel storage/handling[5]	0	0	0	0	0	0	0	0	0
Miscellaneous sources[6]	26	30	29	39	37	37	168	27	24
Total other sources	26	30	29	39	37	37	168	27	24
Total Airport Sources	**17,704**	**15,003**	**14,357**	**14,737**	**14,640**	**11,853**	**14,436**	**13,112**	**12,056**

Source: KBE and Massport, 2020.
Notes: CO – carbon monoxide; GSE – ground service equipment; N/A – not available.
Kg/day Kilograms per day. One kg/day is approximately equivalent to 0.40234 tons per year (tpy).
1 The emissions inventory for 1990 is shown in Chapter 7, *Air Quality/Emission Reduction*. Emission inventories for 1991 and 1992 were not prepared.
2 Year 1999 emissions were last re-calculated using EDMS v4.21 in the 2004 ESPR Air Quality Analysis.
3 Beginning in 1996 and later, emissions include vehicles and equipment converted to alternative fuels. Auxiliary power unit (APU) emissions are also included.
4 1999 emission inventory include reductions attributable to compressed natural gas (CNG) shuttle buses.
5 Fuel storage and handling facilities are not sources of CO emissions.
6 Includes the Central Heating and Cooling Plant, emergency electricity generation, and other stationary sources. Fire training emissions were included in 1999. Diesel snow melter usage was added in 1999.

Table I-19 Estimated CO Emissions (kg/day) at Logan Airport 2002-2009

Aircraft/GSE Model:	EDMS v4.11		EDMS v4.21	EDMS v4.5		EDMS v5.0.1		EDMS v5.0.2		EDMS v5.1		EDMS v5.1.2
Motor Vehicle Model:	**MOBILE 6.0**	**MOBILE 6.2.01**	**MOBILE 6.2.03**									
Year:	**2002**	**2003**	**2004**	**2005**	**2006**		**2007**		**2008**		**2009**	
Aircraft Sources												
Air carriers	2,156	2,128	2,985	2,895	2,828	3,167	2,973	2,973	2,710	2,710	2,460	2,448
Commuter aircraft	783	846	1,010	1,010	950	1,587	2,484	2,484	2,436	2,436	2,364	2,795
Cargo aircraft	285	209	229	174	138	158	241	241	255	255	256	266
General aviation	256	276	416	437	398	442	401	403	345	345	145	150
Total aircraft sources	3,480	3,459	4,640	4,516	4,314	5,354	6,099	6,101	5,746	5,746	5,225	5,659
Ground Support Equipment[1]	5,170	4,758	3,586	3,531	3,409	1,586	1,904	1,904	1,609	1,609	1,364	1,364
Motor Vehicles												
Ted Williams Tunnel through-traffic[2]	112	0	0	0	0	0	0	0	0	0	0	0
Parking/curbside[3]	295	253	180	179	144	144	139	139	117	117	107	107
On-airport vehicles	1,872	1,685	1,412	1,290	1,036	1,036	1,038	1,038	834	834	740	740
Total motor vehicle sources	2,279	1,938	1,592	1,469	1,180	1,180	1,177	1,177	951	951	847	847
Other Sources												
Fuel storage/handling[4]	0	0	0	0	0	0	0	0	0	0	0	0
Miscellaneous sources[5]	23	22	33	40	24	24	51	51	55	55	55	55
Total other sources	23	22	33	40	24	24	51	51	55	55	55	55
Total Airport Sources	**10,952**	**10,177**	**9,851**	**9,556**	**8,927**	**8,144**	**9,231**	**9,233**	**8,361**	**8,361**	**7,491**	**7,925**

Source: KBE and Massport, 2020.
Notes: CO – carbon monoxide; GSE – ground service equipment.
Kg/day Kilograms per day. One kg/day is approximately equivalent to 0.40234 tons per year (tpy).
Years 2006 to 2009 were computed with previous years EDMS version to provide for a common basis of comparison.
1 GSE emissions include auxiliary power units (APUs) as well as vehicles and equipment converted to alternative fuels.
2 Due to the new roadway configuration and opening of the Ted Williams Tunnel there was no Ted Williams Tunnel through-traffic at Logan Airport beginning in 2003.
3 Parking/curbside information is based on vehicle miles traveled (VMT) analysis.
4 Fuel storage/handling facilities are not a source of carbon monoxide (CO) emissions.
5 Includes the Central Heating and Cooling Plant, emergency electricity generation, snow melter usage, and other stationary sources.

Table I-20 Estimated $PM_{10}/PM_{2.5}$ Emissions (kg/day) at Logan Airport, 2005-2009[1]

Aircraft/GSE Model:	**EDMS v4.5**		**EDMS v5.0.1**		**EDMS v5.0.2**		**EDMS v5.1**		**EDMS v5.1.2**
Motor Vehicle Model:	**MOBILE 6.2.03**								
Year:	**2005**	**2006**		**2007**		**2008**		**2009**	
Aircraft Sources									
Air carriers	25	25	38	35	67	63	42	43	36
Commuter aircraft	1	1	2	6	14	11	6	5	5
Cargo aircraft	2	3	2	3	6	5	4	4	3
General aviation	2	2	2	2	5	5	4	2	2
Total aircraft sources	30	31	44	46	92	84	56	54	46
Ground Support Equipment[2]	11	9	9	10	10	8	15	14	14
Motor Vehicles									
Parking/curbside[3]	1	1	1	<1	<1	<1	<1	<1	<1
On-airport vehicles	8	8	8	9	9	7	7	6	6
Total motor vehicle sources	9	9	9	9	9	7	7	6	6
Other Sources									
Fuel storage/handling[4]	0	0	0	0	0	0	0	0	0
Miscellaneous sources[5]	34	16	16	17	17	3	3	5	5
Total other sources	34	16	16	17	17	3	3	5	5
Total Airport Sources	**84**	**65**	**78**	**82**	**128**	**102**	**81**	**79**	**71**

Source: KBE and Massport, 2020.
Notes: GSE – ground service equipment; PM – particulate matter.
Kg/day Kilograms per day. One kg/day is approximately equivalent to 0.40234 tons per year (tpy);
Years 2006 to 2009 were computed with previous years EDMS version to provide for a common basis of comparison.
1 2005 is the first year that $PM_{10}/PM_{2.5}$ emissions were included in the Logan Airport ESPR/EDR emission inventories.
2 GSE emissions include auxiliary power units (APUs) as well as vehicles and equipment converted to alternative fuels.
3 Parking/curbside is based on vehicle miles traveled (VMT) analysis.
4 Fuel storage and handling facilities are not sources of PM emissions.
5 Includes the Central Heating and Cooling Plant, emergency electricity generation, fire training, snow melters, and other stationary sources.

Greenhouse Gas (GHG) Emissions Inventory for 2018 and 2019

The Massachusetts Executive Office of Energy and Environmental Affairs (EEA) has published the *MEPA Greenhouse Gas Emissions Policy and Protocol*.[6] These guidelines require that certain projects undergoing review under the Massachusetts Environmental Policy Act (MEPA) quantify the greenhouse gas (GHG) emissions generated by proposed projects, and identify measures to avoid, minimize, or mitigate such emissions.[7] Even though the *2018/2019 EDR* does not assess any proposed projects and is therefore not subject to the GHG policy, Massport has prepared an emission inventory of GHG emissions directly and indirectly associated with Logan Airport.

In April 2009, the Transportation Research Board Airport Cooperative Research Program (ACRP); published the *Guidebook on Preparing Airport Greenhouse Gas Emission Inventories (ACRP Report 11)*, which provides recommended instructions to airport operators on how to prepare an airport-specific GHG emissions inventory.[8] The 2018 and 2019 GHG emissions estimates include aircraft (within the ground taxi/delay and up to 3,000 feet), GSE, APU, motor vehicles, a variety of stationary sources, and electricity usage. Aircraft cruise emissions over the 3,000-foot level were not included. This work was accomplished following the EEA guidelines and uses emission factors considered appropriate for this application that have been approved by the EPA and are available within the GHG Emissions Factors Hub database.[9]

Methodology

Airport GHG emissions are calculated in much the same way as criteria pollutants,[10] through the use of input data such as activity levels or material throughput rates (i.e., fuel usage, VMT, electrical consumption) that are applied to appropriate emission factors (i.e., in units of GHG emissions per gallon of fuel).

In this case, the input data were either based on Massport records, or data and information derived from the latest version of the FAA AEDT. **Table I-21** summarizes the data and information used in the 2018 and 2019 GHG emission inventories.

Massport will update the GHG Emissions Inventory for Logan Airport annually.

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6 Revised MEPA Greenhouse Gas Emissions Policy and Protocol, Massachusetts Executive Office of Energy and Environmental Affairs, effective May 10, 2010, See https://www.mass.gov/files/documents/2016/08/rp/ghg-policy-final-summary.pdf for the full report.

7 These GHGs are comprised primarily of carbon dioxide (CO_2), methane (CH_4), nitrous oxides (N_2O), and three groups of fluorinated gases (i.e., sulfur hexafluoride [SF_6], hydrofluorocarbons [HFCs], and perfluorocarbons [PFCs]). GHG emission sources associated with airports are generally limited to CO_2, CH_4, and N_2O.

8 Transportation Research Board, Airport Cooperative Research Panel, ACRP Report 11, Project 02-06, Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories (in production). See http://onlinepubs.trb.org/onlinepubs/acrp/acrp_rpt_011.pdf for the full report.

9 Environmental Protection Agency, GHG Emissions Factors Hub (26 March, 2020), https://www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub. The most recent version of the Emission Factors Hub includes updates to emission factors for stationary and mobile combustion sources, new electricity emission factors from EPA's Emissions & Generation Resource Integrated Database (eGRID2018) and the IPCC Fifth Assessment Report (AR4/AR5).

10 Criteria pollutants are pollutants for which there are National Ambient Air Quality Standards (NAAQS) (i.e., carbon monoxide, sulfur dioxide, nitrogen dioxide, etc.).

Table I-21 Logan Airport Greenhouse Gas (GHG) Inventory Input Data and Information for 2018 and 2019

Activity		Fuel Type	2018 Usage	2019 Usage	Units	Source
Aircraft						
Aircraft Taxi		Jet A[1]	22,209,425	23,392,796	gallons	AEDT 3c
		AvGas[2]	70,646	71,724	gallons	AEDT 3c
Engine Startup		Jet A	507,895	516,103	gallons	AEDT 3c
Aircraft AGL to 3,000 feet		Jet A[1]	25,812,938	26,594,677	gallons	AEDT 3c
		AvGas[2]	150,823	149,154	gallons	AEDT 3c
Aircraft Support Equipment						
Ground Service Equipment (GSE)		Diesel	728,539	766,075	gallons	Massport
		Gasoline	888,921	944,648	gallons	Massport
		Propane	4,055	4,000	gallons	Massport
		CNG	0	0	ft^3	Massport
Auxiliary Power Units (APU)		Jet A	1,349,044	1,412,480	gallons	AEDT 3c
Motor Vehicles						
On-airport Vehicles		Composite[3]	73,955,618	76,581,855	VMT	Massport
On-airport Parking/Curbsides		Composite[3]	1,355,975	1,314730	hours	Massport
Massport Shuttle Bus		CNG	308,700	293,340	GEG	Massport
		Diesel	Defleeted in 2014	Defleeted in 2014	gallons	Massport
Massport Express Bus		Diesel	421,952	451,280	gallons	Massport
NABI Articulated Buses		Diesel	367,562	311,800	gallons	Massport
Massport Fire Rescue		Diesel	15,000	10,000	gallons	Massport
Agricultural Equipment		Diesel	84,149	78,825	gallons	Massport
Massport Fleet Vehicles	Honda Civic, etc.	CNG	300	0	GEG	Massport
	Fueled Onsite	Gasoline	269,009	256,120	gallons	Massport
		Diesel	84,192	88,064	gallons	Massport
	Fueled Offsite	Gasoline	85,814	87,687	gallons	Massport
Off-airport Vehicles	Public	Composite[3]	215,263,407	233,600,994	VMT	Massport
	Airport Employees	Composite[3]	5,624,374	5,840,086	VMT	Massport
	Tenant Employees	Composite[3]	50,619,369	52,560,770	VMT	Massport

Table I-21 Logan Airport Greenhouse Gas (GHG) Inventory Input Data and Information for 2018 and 2019 (Continued)

Activity		Fuel Type	2018 Usage	2019 Usage	Units	Source
Stationary Sources						
Boilers and Space Heaters		No. 2 Oil	25,664	52,491	gallons	Massport
		No. 6 Oil	0	0	gallons	Massport
		Natural Gas	417	511	million ft^3	Massport
Generators		ULSD	33,142	40,075	gallons	Massport
		Natural Gas	0.5	0	million ft^3	Massport
Snow melters		ULSD	187,786	125,133	gallons	Massport
		Natural Gas	5.5	4.1	million ft^3	Massport
Fire Training Facility		Tekflame	6,207	6,374	gallons	Massport
		AvGas	1,159	1,001	gallons	Massport
Electrical Consumption	Massport	-	15,859,750	15,331,545	kWh	Massport
	Tenant/Common Area	-	171,020,250	165,324,455	kWh	Massport

Sources: Massport and KBE, 2020.
Notes: AGL – above ground level; AvGas – Aviation Gasoline; CNG – compressed natural gas; ft^3 – cubic feet; GEG – gasoline equivalent gallons; kWh – kilowatt hours; ULSD – ultra low sulfur diesel; VMT – vehicle miles traveled.
1 Jet A density of 6.84 pounds per gallon.
2 AvGas density of 6.0 pounds per gallon.
3 Composite means gasoline, diesel, and ethanol fueled motor vehicles.

Emission factors were obtained from the most recent versions of EPA's MOVES, and GHG Emission Factors Hub. **Tables I-22** and **I-23** present emission factors for carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4), for 2018 and 2019, respectively.

Table I-22 Greenhouse Gas (GHG) Emission Factors for 2018

Sources	Fuel	CO_2	N_2O	CH_4	Units
Aircraft[1]	Jet A	21.5	0.00066	-[4]	lb/gallon
	AvGas	18.3	0.00024	0.01556	lb/gallon
Ground Support Equipment (GSE)/ Auxiliary Power Units (APUs)[1]	Diesel	22.5	0.00018	0.00090	lb/gallon
	Gasoline	19.4	0.00018	0.00084	lb/gallon
	CNG	120	0.00023	0.00226	lb/1000 ft^3
	Propane	12.6	0.00011	0.00060	lb/gallon
	Jet A	21.5	0.00066	-[4]	lb/gallon
Motor Vehicles[1,2]	Composite	515	0.00004	0.00373	g/mile
	Composite	4,498	0.00021	0.01645	g/hour-vehicle
	CNG	120	0.00023	0.00226	lb/1000 ft^3
	Diesel (on-road)	22.5	0.00018	0.00090	lb/gallon
	Diesel (off-road)	22.5	0.00108	0.00062	lb/gallon
	Gasoline	19.4	0.00018	0.00084	lb/gallon
Stationary Sources[1]	No. 2 Oil	22.5	0.00018	0.00090	lb/gallon
	No. 6 Oil	24.8	0.00020	0.00099	lb/gallon
	Natural Gas	120	0.00023	0.00226	lb/1000 ft^3
	ULSD	22.5	0.00018	0.00090	lb/gallon
Fire Training Facility[1]	Tekflame[3]	12.6	0.00011	0.00060	lb/gallon
	AvGas	18.3	0.00024	0.01556	lb/gallon
Electrical Consumption[1]	-	0.52	0.00001	0.00008	lb/kW-hr

Sources: Massport and KBE, 2020.

Notes: CH_4 – methane; CNG – compressed natural gas; CO_2 – carbon dioxide; g- grams; ft^3 – cubic feet; kWh – kilowatt hour; lb – pound; N_2O – nitrous oxides; ULSD – Ultra Low Sulfur Diesel.

1 EPA, GHG Emissions Factors Hub (March 2020), https://www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub.

2 EPA, MOVES2014b, http://www.epa.gov/otaq/models/moves/.

3 As propane.

4 Contributions of CH_4 emissions from commercial aircraft are reported as zero. Years of scientific measurement campaigns conducted at the exhaust exit plane of commercial aircraft gas turbine engines have repeatedly indicated that CH_4 emissions are consumed over the full emission flight envelope [Reference: Aircraft Emissions of Methane and Nitrous Oxide during the Alternative Aviation Fuel Experiment, Santoni et al., Environ. Sci. Technol., July 2011, Volume 45, pp. 7075-7082]. As a result, EPA published that: "…methane is no longer considered to be an emission from aircraft gas turbine engines burning Jet A at higher power settings and is, in fact, consumed in net at these higher powers." [Reference: EPA, Recommended Best Practice for Quantifying Speciated Organic Gas Emissions from Aircraft Equipped with Turbofan, Turbojet, and Turboprop Engines, May 27, 2009 [EPA-420-R-09-901], http://www.epa.gov/otaq/aviation.htm]. In accordance with the following statements in the 2006 IPCC Guidelines (IPCC 2006), FAA does not calculate CH_4 emissions for either the domestic or international bunker commercial aircraft jet fuel emissions inventories. "Methane (CH_4) may be emitted by gas turbines during idle and by older technology engines, but recent data suggest that little or no CH_4 is emitted by modern engines." "Current scientific understanding does not allow other gases (e.g., N_2O and CH_4) to be included in calculation of cruise emissions." (IPCC 1999).

Table I-23 Greenhouse Gas (GHG) Emission Factors for 2019

Sources	Fuel	CO_2	N_2O	CH_4	Units
Aircraft[1]	Jet A	21.5	0.00066	-[4]	lb/gallon
	AvGas	18.3	0.00024	0.01556	lb/gallon
Ground Support Equipment (GSE)/ Auxiliary Power Units (APUs)[1]	Diesel	22.5	0.00018	0.00090	lb/gallon
	Gasoline	19.4	0.00018	0.00084	lb/gallon
	CNG	120.0	0.00023	0.00226	lb/1000 ft^3
	Propane	12.6	0.00011	0.00060	lb/gallon
	Jet A	21.5	0.00066	-[4]	lb/gallon
Motor Vehicles[1,2]	Composite	502	0.00005	0.00370	g/mile
	Composite	4,386	0.00017	0.01516	g/hour-vehicle
	CNG	120.0	0.00023	0.00226	lb/1000 ft^3
	Diesel (on-road)	22.5	0.00018	0.00090	lb/gallon
	Diesel (off-road)	22.5	0.00108	0.00062	lb/gallon
	Gasoline	19.4	0.00018	0.00084	lb/gallon
Stationary Sources[1]	No. 2 Oil	22.5	0.00018	0.00090	lb/gallon
	No. 6 Oil	24.8	0.00020	0.00099	lb/gallon
	Natural Gas	120.0	0.00023	0.00226	lb/1000 ft^3
	ULSD	22.5	0.00018	0.00090	lb/gallon
Fire Training Facility[1]	Tekflame[3]	12.6	0.00011	0.00060	lb/gallon
	AvGas	18.3	0.00024	0.01556	lb/gallon
Electrical Consumption[1]	-	0.52	0.00001	0.00008	lb/kW-hr

Sources: Massport and KBE, 2020.

Notes: CH_4 – methane; CNG – compressed natural gas; CO_2 – carbon dioxide; g- grams; ft^3 – cubic feet; kWh – kilowatt hour; lb – pound; N_2O – nitrous oxides; ULSD – Ultra Low Sulfur Diesel.

1 EPA, GHG Emissions Factors Hub (March 2020), https://www.epa.gov/climateleadership/center-corporate-climate-leadership-ghg-emission-factors-hub.

2 EPA, MOVES2014b, http://www.epa.gov/otaq/models/moves/.

3 As propane.

4 Contributions of CH_4 emissions from commercial aircraft are reported as zero. Years of scientific measurement campaigns conducted at the exhaust exit plane of commercial aircraft gas turbine engines have repeatedly indicated that CH_4 emissions are consumed over the full emission flight envelope [Reference: Aircraft Emissions of Methane and Nitrous Oxide during the Alternative Aviation Fuel Experiment, Santoni et al., Environ. Sci. Technol., July 2011, Volume 45, pp. 7075-7082]. As a result, EPA published that: "…methane is no longer considered to be an emission from aircraft gas turbine engines burning Jet A at higher power settings and is, in fact, consumed in net at these higher powers." [Reference: EPA, Recommended Best Practice for Quantifying Speciated Organic Gas Emissions from Aircraft Equipped with Turbofan, Turbojet, and Turboprop Engines, May 27, 2009 [EPA-420-R-09-901], http://www.epa.gov/otaq/aviation.htm]. In accordance with the following statements in the 2006 IPCC Guidelines (IPCC 2006), FAA does not calculate CH_4 emissions for either the domestic or international bunker commercial aircraft jet fuel emissions inventories. "Methane (CH_4) may be emitted by gas turbines during idle and by older technology engines, but recent data suggest that little or no CH_4 is emitted by modern engines." "Current scientific understanding does not allow other gases (e.g., N_2O and CH_4) to be included in calculation of cruise emissions." (IPCC 1999).

Results

Tables I-24 ad **I-25** present the results of the 2018 and 2019 GHG emissions inventory for Logan Airport, respectively. The results are presented in million metric tons of CO_2 equivalent (MMT CO_2eq) by emission source (i.e., aircraft, GSE, motor vehicles, and stationary sources) and compound (i.e., CO_2, N_2O, and CH_4).

Table I-24 Greenhouse Gas (GHG) Emissions (MMT CO_2eq) for 2018

Activity	CO_2	N_2O	CH_4	Total
Aircraft Sources				
Aircraft Taxi	0.22	<0.01	<0.01	0.22
Engine Startup	<0.01	<0.01	-	<0.01
Aircraft AGL to 3,000 feet	0.25	<0.01	<0.01	0.26
Aircraft Support Equipment				
Ground Service Equipment (GSE)	0.02	<0.01	<0.01	0.02
Auxilary Power Unit (APU)	0.01	<0.01	-	0.01
Motor Vehicles				
On-airport Vehicles	0.04	<0.01	<0.01	0.04
On-airport Parking/Curbsides	0.01	<0.01	<0.01	0.01
Massport Shuttle Buses	0.01	<0.01	<0.01	0.01
Massport Fleet Vehicles	0.01	<0.01	<0.01	0.01
Off-airport Vehicles (Public)	0.11	<0.01	<0.01	0.11
Off-airport Vehicles (Airport Employees)	<0.01	<0.01	<0.01	<0.01
Off-airport Vehicles (Tenant Employees)	0.03	<0.01	<0.01	0.03
Stationary Sources				
Boilers	0.02	<0.01	<0.01	0.02
Generators, Snow melters, etc.	<0.01	<0.01	<0.01	<0.01
Fire Training Facility	<0.01	<0.01	<0.01	<0.01
Electrical Consumption	0.04	<0.01	<0.01	0.04
Total Airport Sources	**0.77**	**<0.01**	**<0.01**	**0.78**

Sources: Massport and KBE, 2020.

Notes: AGL – above ground level; CH_4 – methane; CO_2 – carbon dioxide; MMT CO_2eq - million metric tons of CO_2 equivalent (1 metric ton = 1.1 short tons); N_2O – nitrous oxides.

Table I-25 Greenhouse Gas (GHG) Emissions (MMT CO_2eq) for 2019

Activity	CO_2	N_2O	CH_4	Total
Aircraft Sources				
Aircraft Taxi	0.23	<0.01	<0.01	0.23
Engine Startup	0.01	<0.01	<0.01	0.01
Aircraft AGL to 3,000 feet	0.26	<0.01	<0.01	0.26
Aircraft Support Equipment				
Ground Service Equipment (GSE)	0.02	<0.01	<0.01	0.02
Auxilary Power Unit (APU)	0.01	<0.01	-	0.01
Motor Vehicles				
On-airport Vehicles	0.04	<0.01	<0.01	0.04
On-airport Parking/Curbsides	0.01	<0.01	<0.01	0.01
Massport Shuttle Buses	0.01	<0.01	<0.01	0.01
Massport Fleet Vehicles	0.01	<0.01	<0.01	0.01
Off-airport Vehicles (Public)	0.12	<0.01	<0.01	0.12
Off-airport Vehicles (Airport Employees)	<0.01	<0.01	<0.01	<0.01
Off-airport Vehicles (Tenant Employees)	0.03	<0.01	<0.01	0.03
Stationary Sources				
Boilers	0.03	<0.01	<0.01	0.03
Generators, Snow melters, etc.	<0.01	<0.01	<0.01	<0.01
Fire Training Facility	<0.01	<0.01	<0.01	<0.01
Electrical Consumption	0.04	<0.01	<0.01	0.04
Total Airport Sources	**0.80**	**<0.01**	**<0.01**	**0.81**

Sources: Massport and KBE, 2020.

Notes: AGL – above ground level; CH_4 – methane; CO_2 – carbon dioxide; MMT CO_2eq - million metric tons of CO_2 equivalent (1 metric ton = 1.1 short tons); N_2O – nitrous oxides.

Table I-26 compares the total GHG emission from Logan Airport to the total GHG emissions for Massachusetts for the years 2018 and 2019. Massachusetts state totals are based on the *Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2017* report.

Table I-26 Logan Airport Greenhouse Gas (GHG) Emissions Compared to Massachusetts Totals[1]

	CO_2	N_2O	CH_4	Totals
Logan Airport Emissions (2018)[2]	0.77	<0.01	<0.01	0.78
Logan Airport Emissions (2019)[2]	0.80	<0.01	<0.01	0.81
Massachusetts[3,4]	71.0	0.6	1.7	73.3
Percent of Logan Airport to Massachusetts[5]	1%	<1%	<1%	1%

Sources: Massport and KBE, 2020.
Notes: CH_4 – methane; CO_2 – carbon dioxide; N_2O – nitrous oxides.
1 Totals expressed in units of million metric tons of CO_2 equivalents (MMT CO_2eq): 1 metric ton = 1.1 short tons.
2 Total from Massport, tenants, and public categories.
3 MassDEP, Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2017, available at https://www.mass.gov/lists/massdep-emissions-inventories#greenhouse-gas-baseline,-inventory-&-projection.
4 Totals include CO_2, CH_4, N_2O and other GHG gases.
5 Percentages represent the relative amount Logan Airport-related emissions compared to the state totals.

2007-2019 Greenhouse Gas (GHG) Emissions Inventories

Table I-27 provides a comparison between Airport-related GHG emissions from 2009 through 2019. Total GHG emissions in 2018 are approximately 10 percent higher than 2017 levels, and 2019 are 4 percent higher than 2018 levels. To equally compare to previous years, the 2018 and 2019 emissions are summarized in a manner similar to previous years.

Table I-27 Comparison of Estimated Total Greenhouse Gas (GHG) Emissions (MMT of CO_2eq) at Logan Airport – 2007 through 2019[1]

Source	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Direct Emissions[2]													
Aircraft[3]	0.22	0.21	0.19	0.18	0.19	0.19	0.19	0.20	0.21	0.19	0.21	0.22	0.24
GSE/APUs	0.08	0.08	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.03	0.03	0.03
Motor vehicles[4]	0.03	0.03	0.03	0.03	0.04	0.03	0.05	0.05	0.05	0.05	0.05	0.06	0.06
Other sources[5]	0.04	0.03	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Total Direct Emissions	**0.37**	**0.35**	**0.27**	**0.27**	**0.28**	**0.26**	**0.29**	**0.29**	**0.32**	**0.29**	**0.32**	**0.34**	**0.36**
Indirect Emissions[6]													
Aircraft[7]	0.18	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.18	0.22	0.24	0.26	0.26
Motor vehicles[8]	0.05	0.05	0.05	0.05	0.06	0.05	0.08	0.07	0.08	0.09	0.10	0.14	0.15
Electrical consumption[9]	0.09	0.08	0.07	0.07	0.08	0.08	0.06	0.06	0.06	0.06	0.05	0.04	0.04
Total Indirect Emissions	**0.32**	**0.30**	**0.29**	**0.29**	**0.30**	**0.30**	**0.31**	**0.30**	**0.32**	**0.36**	**0.39**	**0.44**	**0.45**
Total Emissions[10]	**0.69**	**0.65**	**0.56**	**0.56**	**0.58**	**0.57**	**0.60**	**0.60**	**0.63**	**0.65**	**0.71**	**0.78**	**0.81**
Percent of State Totals[11]	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**<1**	**1**	**1**

Sources: Massport and KBE, 2020.

Notes: APU – Auxiliary Power Unit; CH_4 – methane; CO_2 – carbon dioxide; GSE- Ground Service Equipment; N_2O – nitrous oxides. Totals may not add exactly due to rounding.

1 MMT – million metric tons of CO_2 equivalents (1 MMT = 1.1M Short Tons). CO_2 equivalents (CO_2eq) are bases for reporting the three primary GHGs (e.g., CO_2, N_2O and CH_4) in common units. Quantities are reported as "rounded" and truncated values for ease of addition.

2 Direct emissions are those that occur in areas located within the Airport's geographic boundaries.

3 Direct aircraft emissions-based engine start-up, taxi-in, taxi-out and ground-based delay emissions.

4 Direct motor vehicle emissions based on on-site vehicle miles traveled (VMT).

5 Other sources include Central Heating and Cooling Plant, emergency generators, snow melters, space heaters and live fire training activities.

6 Indirect emissions are those that occur off the Airport site.

7 Indirect aircraft emissions are based on take-off, climb-out and landing emissions which occur up to an altitude of 3,000 ft., the limits of the landing and takeoff (LTO) cycle.

8 Indirect motor vehicle emissions based on off-site Airport-related VMT and an average round trip distance of approximately 60 miles.

9 Electrical consumption emissions occur off-airport at power generating plants.

10 Total Emissions = Direct + Indirect.

11 Percentage based on relative amount of Airport total of direct emissions to statewide total from MassDEP, Massachusetts Annual Greenhouse Gas Emissions Inventory: 1990-2017, available at https://www.mass.gov/lists/massdep-emissions-inventories#greenhouse-gas-baseline,-inventory-&-projection.

J

Environmental Compliance and Management/Water Quality

This appendix provides detailed information in support of Chapter 8, *Environmental Compliance and Management/Water Quality*:

- Figure J-1 Massachusetts Contingency Plan Sites (Closed)
- Sustainable Massport Monthly Newsletters, 2018 and 2019

  February 2018: Sustainable Transportation

  March 2018: Water Resources and Conservation

  April 2018: Health and Wellness

  May 2018: Parks and Open Space

  June 2018: Air Quality and Greenhouse Gas Reduction

  July 2018: Natural Resources

  August 2018: Climate Change Adaptation and Resiliency

  September 2018: Community Partnerships

  October 2018: Energy Efficiency

  November 2018: Waste Management and Recycling

  December 2018: Sustainable Tenants

  August 2019: Sustainability Highlights

  October 2019: Sustainable Massport Newsletter

Table J-1 Logan Airport National Pollutant Discharge Elimination System (NPDES) Permit (No. MA0000787) Stormwater Outfall Monitoring Requirements (2007)

Monitoring Event	North Outfall 001		West Outfall 002		Maverick Outfall 003	
	Field Measurement	Laboratory Analysis	Field Measurement	Laboratory Analysis	Field Measurement	Laboratory Analysis
Monthly Dry Weather	Not Required	Oil and Grease TSS[1] Benzene Surfactant Fecal Coliform *Enterococcus*	Not Required	Oil and Grease TSS[1] Benzene Surfactant Fecal Coliform *Enterococcus*	Not Required	Oil and Grease TSS[1] Benzene Surfactant Fecal Coliform *Enterococcus*
Monthly Wet Weather	pH Flow Rate[6]	Oil and Grease TSS[1] Benzene[2] Surfactant Fecal Coliform *Enterococcus*	pH Flow Rate[6]	Oil and Grease TSS[1] Benzene[2] Surfactant Fecal Coliform *Enterococcus*	pH Flow Rate[6]	Oil and Grease TSS[1] Benzene[2] Surfactant Fecal Coliform *Enterococcus*
Quarterly Wet Weather	pH Flow Rate[6]	PAHs[3]: - Benzo(a)anthracene - Benzo(a)pyrene - Benzo(b)fluoranthene - Benzo(k)fluoranthene - Chrysene -Dibenzo(a,h)anthracene - Indeno(1,2,3-cd)pyrene - Naphthalene	pH Flow Rate[6]	PAHs[3]: - Benzo(a)anthracene - Benzo(a)pyrene - Benzo(b)fluoranthene - Benzo(k)fluoranthene - Chrysene -Dibenzo(a,h)anthracene - Indeno(1,2,3-cd)pyrene - Naphthalene	pH Flow Rate[6]	PAHs[3]: - Benzo(a)anthracene - Benzo(a)pyrene - Benzo(b)fluoranthene - Benzo(k)fluoranthene - Chrysene -Dibenzo(a,h)anthracene - Indeno(1,2,3-cd)pyrene - Naphthalene
Deicing Episode (2/Deicing Season)	Not Required	Ethylene Glycol Propylene Glycol BOD5[4] COD[5] Total Ammonia Nitrogen Nonylphenol Tolyltriazole	Not Required	Ethylene Glycol Propylene Glycol BOD5[4] COD[5] Total Ammonia Nitrogen Nonylphenol Tolyltriazole	Not Required	Not Required
Whole Effluent Toxicity (1st and 3rd Year Deicing Season)	Not Required	Menidia beryllina Arbacia punctulata	Not Required	Menidia beryllina Arbacia punctulata	Not Required	Not Required
Treatment System Sampling (Internal Outfalls)[7]	pH Quantity, Gallons	Oil and Grease TSS[1] Benzene[2]	Not Required	Not Required	Not Required	Not Required

Table J-1 Logan Airport NPDES Permit (No. MA0000787) Stormwater Outfall Monitoring Requirements (2007) (Continued)

Monitoring Event	Northwest Outfall 005		Porter Outfall 003 (3 upstream locations)		Select Runway/Perimeter Outfalls	
	Field Measurement	Laboratory Analysis	Field Measurement	Laboratory Analysis	Field Measurement	Laboratory Analysis
Monthly Dry Weather	Not Required	Not Required	Not Required	Oil and Grease TSS[1] Benzene Surfactant Fecal Coliform *Enterococcus*	Not Required	Not Required
Monthly Wet Weather	Not Required	Not Required	pH Flow Rate	Oil and Grease TSS[1] Benzene[2] Surfactant Fecal Coliform *Enterococcus*	Not Required	Not Required
Quarterly Wet Weather	pH Flow Rate[6]	Oil and Grease TSS[1] Benzene[2]	pH Flow Rate[6]	PAHs[3]: - Benzo(a)anthracene - Benzo(a)pyrene - Benzo(b)fluoranthene - Benzo(k)fluoranthene - Chrysene -Dibenzo(a,h)anthracene - Indeno(1,2,3-cd)pyrene - Naphthalene	pH	Oil and Grease TSS[1] Benzene[2]
Deicing Episode (2/Deicing Season)	Not Required	Not Required	Not Required	Ethylene Glycol Propylene Glycol BOD5[4] COD[5] Total Ammonia Nitrogen Nonylphenol Tolytriazole	Not Required	Ethylene Glycol Propylene Glycol BOD5[4] COD[5] Total Ammonia Nitrogen Nonylphenol Tolytriazole
Whole Effluent Toxicity (1st and 3rd Year Deicing Season)	Not Required	Not Required	Not Required	Menidia beryllina Arbacia punctulata	Not Required	Not Required
Treatment System Sampling (Internal Outfalls)[7]	Not Required	Not Required	Not Required	Not Required	Not Required	Not Required

Source: Massport

Notes: Requirements are from NPDES Permit MA0000787, issued July 31, 2007.

1 TSS - Total Suspended Solids

2 Benzene must be collected with HDPE bailer.

3 PAH - Polycyclic Aromatic Hydrocarbons

4 BOD - Biological Oxygen Demand

5 COD - Chemical Oxygen Demand

6 Flow Rate will be estimated based on measured precipitation and the hydraulic model developed for the Logan Airport drainage system.

7 Outfalls 001D and 001E samples collected by Swissport.

Table J-2 Fire Training Facility NPDES Permit (No. MA0032751) Stormwater Outfall Monitoring Requirements (2014)

Monitoring Event	Outfall Serial Number 001	
	Field Measurement	**Laboratory Analysis**
Each Discharge Event[1]	Flow Rate[2] pH	TSS[3] Oil and Grease[4] Total BTEX[5] Toluene Benzene Ethylbenzene Xylene PAHs[5,6]
Whole Effluent Toxicity (once per year during discharge event)	Not Required	Acute Toxicity[7]

Source: Massport

Notes: Requirements are from NPDES Permit MA0032751, issued November 1, 2006.

All samples, except for wet testing, shall be collected after treatment and prior to discharge from above ground holding tank.

1 Flows from more than one training session may be held in treatment train for several weeks. Treatment and subsequent discharge through Outfall 001 is usually triggered by tank levels. Sampling will be conducted during each discharge event with the sampling point after the GAC unit and prior to discharge from the above ground holding tank. Each sample shall be a composite of three equally weighted (same volume) grab samples taken at the bottom, middle, and top of the above ground tank.

2 Total flow volume shall be reported monthly in gallons and the maximum flow rate in gallons per minute shall be reported for each month.

3 TSS - Total Suspended Solids

4 Oil and grease is measured using EPA Method 1664.

5 BTEX and PAH compounds shall be analyzed using EPA approved methods. Testing method used and method detection level for each parameter will be included in each DMR submittal.

6 PAH - Polycyclic Aromatic Hydrocarbons

7 The permittee shall conduct one acute toxicity test per year. The test results shall be submitted by the last day of the full month following completion of the test in accordance with protocols defined in the permit.

Table J-3 Logan Airport 2018 Monthly Monitoring Results for First Quarter — North, West, and Maverick Street Stormwater Outfalls

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)	*Klebsiella*[1] (cfu/100mL)
001A – North Outfall	1/17/2018[2]	Wet Weather	6.957	1.152	7.88	7.90	**150**	<2.0	0.390	30	300	NA
002A – West Outfall	1/17/2018[2]	Wet Weather	23.085	2.035	8.05	<4.0	100	4.70	0.340	1,300	390	NA
004A – Maverick Street Outfall	1/17/2018[2]	Wet Weather	1.179	0.096	7.57	<4.0	10	<1.0	0.120	1,900	730	NA
001C – North Outfall	1/3/2018	Dry Weather				<4.0	27	<1.0	0.090	<10	<10	NA
002C – West Outfall	1/3/2018	Dry Weather				<4.0	22	<1.0	0.320	820	70	NA
004C – Maverick Street Outfall	1/3/2018	Dry Weather				<4.0	13	<1.0	0.060	20	10	NA
001A – North Outfall	2/25/2018	Wet Weather	1.479	1.131	7.44	<4.0	14	<1.0	0.100	NA	NA	NA
002A – West Outfall	2/25/2018	Wet Weather	6.246	1.313	6.71	<4.0	27	<2.5	0.150	NA	NA	NA
004A – Maverick Street Outfall	2/25/2018	Wet Weather	0.181	0.012	6.40	<4.0	51	<1.0	0.120	NA	NA	NA
001C – North Outfall	2/15/2018	Dry Weather				<4.0	**220**	<1.0	0.090	<10	<10	NA
002C – West Outfall	2/15/2018	Dry Weather				<4.0	14	<1.0	0.090	430	190	NA
004C – Maverick Street Outfall	2/15/2018	Dry Weather				<4.0	<5.0	<1.0	0.070	110	50	NA
001A – North Outfall	---	Wet Weather	7.408	1.047	NS	NS	NS	NS	NS	NS	NS	NS
002A – West Outfall	---	Wet Weather	21.908	1.937	NS	NS	NS	NS	NS	NS	NS	NS
004A – Maverick Street Outfall	---	Wet Weather	1.938	0.085	NS	NS	NS	NS	NS	NS	NS	NS
001C – North Outfall	3/19/2018	Dry Weather				<4.0	24	<1.0	0.070	<10	<10	NA
002C – West Outfall	3/19/2018	Dry Weather				<4.0	25	<1.0	0.050	<10	50	NA
004C – Maverick Street Outfall	3/19/2018	Dry Weather				<4.0	<5.0	<1.0	<0.050	<10	<10	NA
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.												
Discharge Limitations												
Maximum Daily			Report	Report	6.0 to 8.5	15 mg/L	100 mg/L	Report	Report	Report	Report	
Average Monthly			Report	Report	6.0 to 8.5	—	Report	Report	Report	Report	Report	

Source: Massport.
Notes: Flow rates were estimated for outfalls 001, 002, and 004 by using the SWMM model developed for Logan Airport.
1 *Klebsiella* is an indication of non-fecal coliform bacteria and is tested for at the North Outfall when fecal coliform concentration exceeds 5,000 cfu/100ml.
2 January 2018 wet weather bacteria samples were collected on 1/23/2018.
NA Not Analyzed
NS Not Sampled
TSS Total Suspended Solids

Table J-4 Logan Airport 2018 Monthly Monitoring Results for First Quarter — Porter Street Stormwater Outfall

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)
003 - Porter Street Outfall 1	1/17/2018[1]	Wet Weather	---	---	7.69	<4.0	300	<1.0	0.290	1,900	2,300
003 - Porter Street Outfall 2	1/17/2018[1]	Wet Weather	---	---	6.75	19	170	<1.0	0.110	<10	20
003 - Porter Street Outfall 3	1/17/2018[1]	Wet Weather	---	---	7.61	<4.0	210	<1.0	0.060	220	110
003 - Porter Street Outfall Average		Wet Weather	4.318	0.354	7.35	6.3	227	0.0	0.153	75	172
003 - Porter Street Outfall 1	1/3/2018	Dry Weather				<4.0	220	<1.0	0.200	<10	310
003 - Porter Street Outfall 2	1/3/2018	Dry Weather				<4.0	54	<1.0	0.090	<10	<10
003 - Porter Street Outfall 3	1/3/2018	Dry Weather				<4.0	12	<1.0	0.130	<10	20
003 - Porter Street Outfall Average		Dry Weather				0.0	95	0.0	0.140	0.0	18
003 - Porter Street Outfall 1	2/25/2018	Wet Weather	---	---	6.35	<4.0	46	<1.0	0.210	NA	NA
003 - Porter Street Outfall 2	2/25/2018	Wet Weather	---	---	6.20	<4.0	32	<1.0	0.050	NA	NA
003 - Porter Street Outfall 3	2/25/2018	Wet Weather	---	---	6.12	<4.0	54	<1.0	0.070	NA	NA
003 - Porter Street Outfall Average		Wet Weather	0.432	0.094	6.22	0.0	44	0.0	0.110	NA	NA
003 - Porter Street Outfall 1	2/15/2018	Dry Weather				<4.0	7.0	<1.0	0.220	<10	<10
003 - Porter Street Outfall 2	2/15/2018	Dry Weather				<4.0	81	<1.0	0.120	<10	<10
003 - Porter Street Outfall 3	2/15/2018	Dry Weather				<4.0	5.7	<1.0	0.150	<10	<10
003 - Porter Street Outfall Average		Dry Weather				0.0	31	0.0	0.163	1.0	1.0
003 - Porter Street Outfall 1	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 2	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 3	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall Average		Wet Weather	3.708	0.325	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 1	3/19/2018	Dry Weather				<4.0	28	<1.0	0.130	160	100
003 - Porter Street Outfall 2	3/19/2018	Dry Weather				<4.0	17	<1.0	0.160	<10	10
003 - Porter Street Outfall 3	3/19/2018	Dry Weather				<4.0	52	<1.0	0.110	<10	20
003 - Porter Street Outfall Average		Dry Weather				0.0	32	0.0	0.133	5.4	27.1
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.											
Discharge Limitations											
Maximum Daily			Report	Report	6.0 to 8.5	Report	Report	Report	Report	Report	Report
Average Monthly			Report	Report	6.0 to 8.5	—	Report	Report	Report	Report	Report

Source: Massport.

Notes: Flow rates were estimated for outfalls 001, 002, 003 and 004 by using the SWMM model developed for Logan Airport.
For averaging calculations, a value of zero was employed for those results measured below the laboratory detection limit. For geometric mean calculations (fecal coliform and Enterococcus) a value of 1 was employed for those results measured below the laboratory detection limit.

1 January 2018 wet weather bacteria samples were collected on 1/23/2018.

TSS Total Suspended Solids

NA Not Analyzed

NS Not Sampled

Table J-5 Logan Airport 2018 Monthly Monitoring Results for Second Quarter — North, West, and Maverick Street Stormwater Outfalls

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)	*Klebsiella*[1] (cfu/100mL)
001A – North Outfall	4/19/2018	Wet Weather	5.275	0.548	6.60	<4.0	6.6	<1.0	0.180	10	60	NA
002A – West Outfall	4/19/2018	Wet Weather	16.566	1.653	7.07	<4.0	30	<1.0	0.070	40	40	NA
004A – Maverick Street Outfall	4/19/2018	Wet Weather	1.308	0.094	6.97	<4.0	11	<1.0	0.070	20	80	NA
001C – North Outfall	4/10/2018	Dry Weather				<4.0	26	<10	<0.050	<10	<10	NA
002C – West Outfall	4/10/2018	Dry Weather				<4.0	11	<1.0	<0.050	<10	30	NA
004C – Maverick Street Outfall	4/10/2018	Dry Weather				<4.0	8.8	<1.0	<0.050	20	20	NA
001A – North Outfall	---	Wet Weather	3.305	0.206	NS	NS	NS	NS	NS	NS	NS	NS
002A – West Outfall	---	Wet Weather	7.636	0.661	NS	NS	NS	NS	NS	NS	NS	NS
004A – Maverick Street Outfall	---	Wet Weather	0.771	0.024	NS	NS	NS	NS	NS	NS	NS	NS
001C – North Outfall	5/11/2018	Dry Weather				<4.0	19	<1.0	0.090	<10	<10	NA
002C – West Outfall	5/11/2018	Dry Weather				<4.0	10	<1.0	0.190	740	60	NA
004C – Maverick Street Outfall	5/11/2018	Dry Weather				<4.0	10	<1.0	<0.050	130	10	NA
001A – North Outfall	6/4/2018	Wet Weather	4.046	0.315	7.17	<4.0	48	<1.0	0.160	1,200	3,500	NA
002A – West Outfall	6/4/2018	Wet Weather	13.23	1.057	6.96	5.1	43	<1.0	0.290	7,100	3,500	NA
004A – Maverick Street Outfall	6/4/2018	Wet Weather	1.027	0.058	7.09	<4.0	**220**	<1.0	0.310	1,500	3,700	NA
001C – North Outfall	6/12/2018	Dry Weather				<4.0	6.3	<1.0	0.080	20	10	NA
002C – West Outfall	6/12/2018	Dry Weather				<4.0	16	<1.0	0.080	1,600	150	NA
004C – Maverick Street Outfall	6/12/2018	Dry Weather				<4.0	9.6	<1.0	<0.050	620	310	NA
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.												
Discharge Limitations												
Maximum Daily			Report	Report	6.0 to 8.5	15 mg/L	100 mg/L	Report	Report	Report	Report	
Average Monthly			Report	Report	6.0 to 8.5	—	Report	Report	Report	Report	Report	

Source: Massport.
Notes: Flow rates were estimated for outfalls 001, 002, 003 and 004 by using the SWMM model developed for Logan Airport.
1 *Klebsiella* is an indication of non-fecal coliform bacteria and is tested for at the North Outfall when fecal coliform concentration exceeds 5,000 cfu/100ml.
TSS Total Suspended Solids
NA Not Analyzed
NS Not Sampled

Table J-6 Logan Airport 2018 Monthly Monitoring Results for Second Quarter — Porter Street Stormwater Outfall

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)
003 - Porter Street Outfall 1	4/19/2018	Wet Weather	---	---	6.92	<4.0	29	<1.0	0.090	90	80
003 - Porter Street Outfall 2	4/19/2018	Wet Weather	---	---	6.43	<4.0	8.7	<1.0	0.050	<10	210
003 - Porter Street Outfall 3	4/19/2018	Wet Weather	---	---	6.25	<4.0	8.7	<1.0	0.050	<10	80
003 - Porter Street Outfall Average		Wet Weather	3.327	0.33	6.53	0.0	15	0.0	0.063	4.5	110
003 - Porter Street Outfall 1	4/10/2018	Dry Weather				<4.0	2,400	<1.0	0.080	<10	50
003 - Porter Street Outfall 2	4/10/2018	Dry Weather				<4.0	15	<1.0	0.050	<10	10
003 - Porter Street Outfall 3	4/10/2018	Dry Weather				<4.0	7.6	<1.0	0.050	<10	<10
003 - Porter Street Outfall Average		Dry Weather				0.0	808	0.0	0.060	1.0	7.9
003 - Porter Street Outfall 1	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 2	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 3	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall Average		Wet Weather	1.707	0.135	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 1	5/11/2018	Dry Weather				<4.0	24	<1.0	0.080	<10	10
003 - Porter Street Outfall 2	5/11/2018	Dry Weather				<4.0	11	<1.0	0.330	30	210
003 - Porter Street Outfall 3	5/11/2018	Dry Weather				<4.0	<5.0	<1.0	0.140	<10	1,100
003 - Porter Street Outfall Average		Dry Weather				0.0	12	0.0	0.183	3.1	132
003 - Porter Street Outfall 1	6/4/2018	Wet Weather	---	---	7.01	<4.0	24	<1.0	0.130	5,300	4,300
003 - Porter Street Outfall 2	6/4/2018	Wet Weather	---	---	6.59	<4.0	8	<1.0	<0.050	10	470
003 - Porter Street Outfall 3	6/4/2018	Wet Weather	---	---	6.34	<4.0	31	<1.0	0.060	810	670
003 - Porter Street Outfall Average		Wet Weather	2.167	0.216	6.65	0.0	16	0.0	0.063	350	1110
003 - Porter Street Outfall 1	6/12/2018	Dry Weather				<4.0	22	<1.0	0.050	50	90
003 - Porter Street Outfall 2	6/12/2018	Dry Weather				<4.0	20	<1.0	0.060	<10	<10
003 - Porter Street Outfall 3	6/12/2018	Dry Weather				<4.0	5.3	<1.0	0.080	<10	10
003 - Porter Street Outfall Average		Dry Weather				0.0	12	0.0	0.063	3.7	10
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.											
Discharge Limitations											
Maximum Daily			Report	Report	6.0 to 8.5	Report	Report	Report	Report	Report	Report
Average Monthly			Report	Report	6.0 to 8.5	—	Report	Report	Report	Report	Report

Source: Massport.

Notes: Flow rates were estimated for outfalls 001, 002, 003, and 0034 by using the SWMM model developed for Logan Airport.
For averaging calculations, a value of zero was employed for those results measured below the laboratory detection limit. For geometric mean calculations (fecal coliform and Enterococcus) a value of 1 was employed for those results measured below the laboratory detection limit.

TSS Total Suspended Solids

NS Not Sampled

Table J-7 Logan Airport 2018 Monthly Monitoring Results for Third Quarter — North, West, and Maverick Street Stormwater Outfalls

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)	*Klebsiella*[1] (cfu/100mL)
001A – North Outfall	---	Wet Weather	7.575	0.408	NS	NS	NS	NS	NS	NS	NS	NS
002A – West Outfall	---	Wet Weather	24.939	1.398	NS	NS	NS	NS	NS	NS	NS	NS
004A – Maverick Street Outfall	---	Wet Weather	2.517	0.098	NS	NS	NS	NS	NS	NS	NS	NS
001C – North Outfall	7/5/2018	Dry Weather				<4.0	7.7	<1.0	0.070	70	30	NA
002C – West Outfall	7/5/2018	Dry Weather				<4.0	7.3	<1.0	0.100	2,500	3,500	NA
004C – Maverick Street Outfall	7/5/2018	Dry Weather				<4.0	<5.0	<1.0	0.050	140	70	NA
001A – North Outfall	8/22/2018	Wet Weather	4.513	0.444	7.38	<4.0	6	<1.0	0.100	4,600	2,500	NA
002A – West Outfall	8/22/2018	Wet Weather	16.078	1.582	8.05	<4.0	15	<1.0	0.130	>80,000	4,300	NA
004A – Maverick Street Outfall	8/22/2018	Wet Weather	1.095	0.094	7.55	<4.0	10	<1.0	0.220	24,000	3,600	NA
001C – North Outfall	8/3/2018	Dry Weather				<4.0	5.9	<2.0	0.070	<10	30	NA
002C – West Outfall	8/3/2018	Dry Weather				<4.0	13	<1.0	<0.050	6,000	710	NA
004C – Maverick Street Outfall	8/3/2018	Dry Weather				<4.0	9.9	<2.0	<0.050	140	60	NA
001A – North Outfall	9/18/2018	Wet Weather	3.807	0.539	6.96	<4.0	7.1	<1.0	0.060	3,200	>80,000	NA
002A – West Outfall	9/18/2018	Wet Weather	12.981	1.919	7.09	<4.0	10	<1.0	0.060	3,100	>80,000	NA
004A – Maverick Street Outfall	9/18/2018	Wet Weather	0.960	0.111	7.16	<4.0	<5.0	<1.0	0.060	3,000	9,000	NA
001C – North Outfall	9/7/2018	Dry Weather				<4.0	21	<1.0	0.410	4,500	480	NA
002C – West Outfall	9/7/2018	Dry Weather				<4.0	11	<1.0	0.280	21,000	6,700	NA
004C – Maverick Street Outfall	9/7/2018	Dry Weather				<4.0	11	<1.0	0.080	800	100	NA
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.												
Discharge Limitations												
Maximum Daily			Report	Report	6.0 to 8.5	15 mg/L	100 mg/L	Report	Report	Report	Report	Report
Average Monthly			Report	Report	6.0 to 8.5	—	Report	Report	Report	Report	Report	Report

Source: Massport
Notes: Flow rates were estimated for outfalls 001, 002, and 004 by using the SWMM model developed for Logan Airport.
1 *Klebsiella* is an indication of non-fecal coliform bacteria and is tested for at the North Outfall when fecal coliform concentration exceeds 5,000 cfu/100ml.
TSS Total Suspended Solids
NA Not Analyzed
NS Not Sampled

Table J-8 Logan Airport 2018 Monthly Monitoring Results for Third Quarter — Porter Street Stormwater Outfall

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)
003 - Porter Street Outfall 1	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 2	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 3	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall Average		Wet Weather	6.331	0.364	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 1	7/5/2018	Dry Weather				<4.0	24	<1.0	0.110	3,400	190
003 - Porter Street Outfall 2	7/5/2018	Dry Weather				<4.0	8	<1.0	<0.050	10	10
003 - Porter Street Outfall 3	7/5/2018	Dry Weather				<4.0	<5.0	<1.0	0.090	<10	20
003 - Porter Street Outfall Average		Dry Weather				0.0	11	0.0	0.067	32.4	34
003 - Porter Street Outfall 1	8/22/2018	Wet Weather	---	---	8.36	<4.0	6	<1.0	0.090	>80,000	5,300
003 - Porter Street Outfall 2	8/22/2018	Wet Weather	---	---	8.03	<4.0	<5.0	<1.0	0.050	20	100
003 - Porter Street Outfall 3	8/22/2018	Wet Weather	---	---	7.82	<4.0	6	<1.0	0.090	510	5,000
003 - Porter Street Outfall Average		Wet Weather	3.214	0.335	8.07	0.0	4	0.0	0.077	934	1,384
003 - Porter Street Outfall 1	8/3/2018	Dry Weather				<4.0	30	<1.0	0.100	12,000	590
003 - Porter Street Outfall 2	8/17/2018	Dry Weather				<4.0	<5.0	<1.0	0.050	130	140
003 - Porter Street Outfall 3	8/3/2018	Dry Weather				6	460	<2.0	0.050	<10	60
003 - Porter Street Outfall Average		Dry Weather				2.0	163	0.0	0.067	116	170
003 - Porter Street Outfall 1	9/18/2018	Wet Weather	---	---	7.00	<4.0	7.3	<1.0	0.110	11,000	8,000
003 - Porter Street Outfall 2	9/18/2018	Wet Weather	---	---	7.21	<4.0	<5.0	<1.0	<0.050	10	110
003 - Porter Street Outfall 3	9/18/2018	Wet Weather	---	---	6.97	<4.0	<5.0	<1.0	<0.050	50	2,500
003 - Porter Street Outfall Average		Wet Weather	2.751	0.416	7.06	0.0	2.4	0.0	0.037	177	1,301
003 - Porter Street Outfall 1	9/7/2018	Dry Weather				<4.0	25	<1.0	0.330	600	1,400
003 - Porter Street Outfall 2	9/7/2018	Dry Weather				<4.0	12	<1.0	0.140	<10	400
003 - Porter Street Outfall 3	9/7/2018	Dry Weather				<4.0	<5.0	<1.0	0.100	220	350
003 - Porter Street Outfall Average		Dry Weather				0.0	12	0.0	0.190	51	581
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.											
Discharge Limitations											
Maximum Daily			Report	Report	6.0 to 8.5	Report	Report	Report	Report	Report	Report
Average Monthly			Report	Report	6.0 to 8.5	—	Report	Report	Report	Report	Report

Source: Massport.

Notes: Flow rates were estimated for outfall 003 by using the SWMM model developed for Logan Airport.
For averaging calculations, a value of zero was employed for those results measured below the laboratory detection limit. For geometric mean calculations (fecal coliform and Enterococcus) a value of 1 was employed for those results measured below the laboratory detection limit.

TSS Total Suspended Solids

NS Not Sampled

Table J-9 Logan Airport 2018 Monthly Monitoring Results for Fourth Quarter — North, West, and Maverick Street Stormwater Outfalls

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)	*Klebsiella*[1] (cfu/100mL)
001A – North Outfall	10/23/2018	Wet Weather	3.671	0.351	7.42	<4.0	13.0	<1.0	0.080	NA	NA	NA
002A – West Outfall	10/23/2018	Wet Weather	12.231	1.251	7.30	<4.0	81	<1.0	0.100	NA	NA	NA
004A – Maverick Street Outfall	10/23/2018	Wet Weather	0.965	0.069	6.51	<4.0	**110**	<1.0	0.100	NA	NA	NA
001C – North Outfall	10/17/2018	Dry Weather				<4.0	21	<1.0	0.100	370	1,500	NA
002C – West Outfall	10/17/2018	Dry Weather				<4.0	12	<1.0	0.050	18,000	5,600	NA
004C – Maverick Street Outfall	10/17/2018	Dry Weather				<4.0	12	<1.0	<0.050	5,100	370	NA
001A – North Outfall	11/13/2018	Wet Weather	5.262	1.072	6.67	<4.0	<5.0	<1.0	<0.050	580	3,500	NA
002A – West Outfall	11/13/2018	Wet Weather	19.345	3.797	6.69	<4.0	14	<1.0	<0.050	180	1,000	NA
004A – Maverick Street Outfall	11/13/2018	Wet Weather	1.266	0.239	6.72	<4.0	6.7	<1.0	<0.050	220	690	NA
001C – North Outfall	11/30/2018	Dry Weather				<4.0	16	<1.0	0.060	<10	40	NA
002C – West Outfall	11/30/2018	Dry Weather				<4.0	18	<1.0	<0.050	260	100	NA
004C – Maverick Street Outfall	11/30/2018	Dry Weather				<4.0	8.1	<1.0	<0.050	50	40	NA
001A – North Outfall	12/21/2018	Wet Weather	2.444	0.289	7.57	<4.0	18	<1.0	0.140	10	160	NA
002A – West Outfall	12/21/2018	Wet Weather	7.729	0.957	8.21	5.9	46	<1.0	0.340	1,400	2,100	NA
004A – Maverick Street Outfall	12/21/2018	Wet Weather	0.568	0.042	6.34	<4.0	64	<1.0	0.090	60	350	NA
001C – North Outfall	12/6/2018	Dry Weather				<4.0	14	<1.0	0.050	<10	<10	NA
002C – West Outfall	12/6/2018	Dry Weather				4.9	15	<1.0	0.060	2,900	1,400	NA
004C – Maverick Street Outfall	12/6/2018	Dry Weather				<4.0	8.4	<1.0	<0.050	710	410	NA
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.												
Discharge Limitations												
Maximum Daily			Report	Report	6.0 to 8.5	15 mg/L	100 mg/L	Report	Report	Report	Report	Report
Average Monthly			Report	Report	6.0 to 8.5	–	Report	Report	Report	Report	Report	Report

Source: Massport.
Notes: Flow rates were estimated for outfalls 001, 002, and 004 by using the SWMM model developed for Logan Airport.
1 *Klebsiella* is an indication of non-fecal coliform bacteria and is tested for at the North Outfall when fecal coliform concentration exceeds 5,000 cfu/100ml.
TSS Total Suspended Solids
NA Not Analyzed

Table J-10 Logan Airport 2018 Monthly Monitoring Results for Fourth Quarter — Porter Street Stormwater Outfall

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)
003 - Porter Street Outfall 1	10/23/2018	Wet Weather	---	---	7.10	<4.0	22.0	<1.0	0.110	NA	NA
003 - Porter Street Outfall 2	10/23/2018	Wet Weather	---	---	6.77	<4.0	14.0	<1.0	0.130	NA	NA
003 - Porter Street Outfall 3	10/23/2018	Wet Weather	---	---	6.61	<4.0	5.9	<1.0	<0.050	NA	NA
003 - Porter Street Outfall Average		Wet Weather	2.548	0.275	6.83	0.0	14.0	0.0	0.080	NA	NA
003 - Porter Street Outfall 1	10/17/2018	Dry Weather				<4.0	19	<1.0	0.100	280	730
003 - Porter Street Outfall 2	10/17/2018	Dry Weather				<4.0	<5.0	<1.0	<0.050	<10	190
003 - Porter Street Outfall 3	10/17/2018	Dry Weather				<4.0	<5.0	<1.0	0.120	80	220
003 - Porter Street Outfall Average		Dry Weather				0.0	6.3	0.0	0.073	28	312
003 - Porter Street Outfall 1	11/13/2018	Wet Weather	---	---	6.82	<4.0	<5.0	<1.0	<0.050	<10	1,900
003 - Porter Street Outfall 2	11/13/2018	Wet Weather	---	---	6.63	<4.0	<5.0	<1.0	<0.050	<10	40
003 - Porter Street Outfall 3	11/13/2018	Wet Weather	---	---	6.78	<4.0	<5.0	<1.0	<0.050	<10	1,200
003 - Porter Street Outfall Average		Wet Weather	3.944	0.812	6.74	0.0	0.0	0.0	0.000	1	450
003 - Porter Street Outfall 1	11/30/2018	Dry Weather				<4.0	7	<1.0	0.130	10	160
003 - Porter Street Outfall 2	11/30/2018	Dry Weather				<4.0	<5.0	<1.0	<0.050	10	110
003 - Porter Street Outfall 3	11/30/2018	Dry Weather				<4.0	10	<1.0	0.100	<10	<10
003 - Porter Street Outfall Average		Dry Weather				0.0	5.6	0.0	0.077	4.6	26
003 - Porter Street Outfall 1	12/21/2018	Wet Weather	---	---	7.00	<4.0	36	<1.0	0.140	510	1,300
003 - Porter Street Outfall 2	12/21/2018	Wet Weather	---	---	6.57	<4.0	5.7	<1.0	0.050	<10	120
003 - Porter Street Outfall 3	12/21/2018	Wet Weather	---	---	6.85	<4.0	<5.0	<1.0	0.060	<10	390
003 - Porter Street Outfall Average		Wet Weather	1.398	0.196	6.81	0.0	13.9	0.0	0.083	8	393
003 - Porter Street Outfall 1	12/6/2018	Dry Weather				<4.0	<5.0	<1.0	0.130	<10	<10
003 - Porter Street Outfall 2	12/6/2018	Dry Weather				<4.0	10	<1.0	<0.050	<10	1,700
003 - Porter Street Outfall 3	12/6/2018	Dry Weather				<4.0	<5.0	<1.0	0.090	<10	280
003 - Porter Street Outfall Average		Dry Weather				0.0	3.2	0.0	0.073	1.0	78
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.											
Discharge Limitations											
Maximum Daily			Report	Report	6.0 to 8.5	Report	Report	Report	Report	Report	Report
Average Monthly			Report	Report	6.0 to 8.5	—	Report	Report	Report	Report	Report

Source: Massport.

Notes: Flow rates were estimated for outfall 003 using the SWMM model developed for Logan Airport.
For averaging calculations, a value of zero was employed for those results measured below the laboratory detection limit. For geometric mean calculations (fecal coliform and Enterococcus) a value of 1 was employed for those results measured below the laboratory detection limit.

TSS Total Suspended Solids

NA Not Analyzed

Table J-11 Logan Airport 2018 Quarterly Wet Weather Monitoring Results – North, West, Maverick Street, and Porter Street Stormwater Outfalls

	Date	pH (S.U.)	Benzo(a)-anthracene (µg/L)	Benzo(a)-pyrene (µg/L)	Benzo(b)-fluoranthene (µg/L)	Benzo(k)-fluoranthene (µg/L)	Chrysene (µg/L)	Dibenzo(a,h,)-anthracene (µg/L)	Indeno(1,2,3-cd)-pyrene (µg/L)	Naphthalene (µg/L)	Total PAHs (µg/L)
001Q - North Outfall	1/17/2018	7.88	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
002Q - West Outfall	1/17/2018	8.05	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	5.5	5.5
004Q - Maverick Street Outfall	1/17/2018	7.57	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall 1	1/17/2018	7.69	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall 2	1/17/2018	6.75	<2.0	<2.0	3.0	<2.0	2.2	<2.0	<2.0	<2.0	5.2
003Q - Porter Street Outfall 3	1/17/2018	7.61	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall Average		7.35	0.0	0.0	1.0	0.0	0.7	0.0	0.0	0.0	1.7
001Q - North Outfall	6/28/2018	7.10	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
002Q - West Outfall	6/28/2018	7.32	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
004Q - Maverick Street Outfall	6/28/2018	7.25	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall 1	6/28/2018	7.31	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall 2	6/28/2018	7.43	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall 3	6/28/2018	7.18	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall Average		7.31	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
001Q - North Outfall	9/18/2018	6.96	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
002Q - West Outfall	9/18/2018	7.09	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
004Q - Maverick Street Outfall	9/18/2018	7.16	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall 1	9/18/2018	7.00	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall 2	9/18/2018	7.21	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall 3	9/18/2018	6.97	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall Average		7.06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
001Q - North Outfall	11/13/2018	6.67	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
002Q - West Outfall	11/13/2018	6.69	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
004Q - Maverick Street Outfall	11/13/2018	6.72	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall 1	11/13/2018	6.82	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall 2	11/13/2018	6.63	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall 3	11/13/2018	6.78	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	ND
003Q - Porter Street Outfall Average		6.74	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.											
Discharge Limitations											
Maximum Daily		6.0 to 8.5	Report	Report	Report	Report	Report	Report	Report	Report	Total

Source: Massport
Notes: For averaging calculations, a value of zero was employed for those results measures below the laboratory detection limit.
PAHs Polynuclear Aromatic Hydrocarbons
ND Not Detected

Table J-12 Logan Airport 2018 Quarterly Wet Weather Monitoring Results – Northwest and Runway/Perimeter Stormwater Outfalls

	Date	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (SU)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)
005Q - Northwest Outfall	1/17/2018[1]	0.698	0.066	7.97	<4.0	15	<2.0
006Q- Runway/ Perimeter Outfall (A9)	1/17/2018[1]	0.543	0.058	8.13	<4.0	10	<1.0
006Q- Runway/ Perimeter Outfall (A15)	1/17/2018[1]	0.209	0.020	8.34	<4.0	12	<1.0
006Q- Runway/ Perimeter Outfall (A16)	1/17/2018[1]	0.210	0.020	8.46	<4.0	6.3	<1.0
006Q- Runway/ Perimeter Outfall (A21)	1/17/2018[1]	4.281	0.429	7.93	<4.0	14	<1.0
006Q- Runway/ Perimeter Outfall (A23)	1/17/2018[1]	0.436	0.044	8.03	<4.0	23	<1.0
006Q- Runway/ Perimeter Outfall (A33)	1/17/2018[1]	0.278	0.032	5.95	<4.0	31	<1.0
006Q- Runway/ Perimeter Outfall (A38)	1/17/2018[1]	0.620	0.059	8.78	<4.0	16	<1.0
006Q- Runway/Perimeter Outfall Average		0.940	0.095	7.95	0.0	16	0.0
005Q - Northwest Outfall	6/28/2018	0.537	0.041	5.21	<4.0	26	<1.0
006Q- Runway/ Perimeter Outfall (A9)	6/28/2018	0.264	0.027	7.74	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A16)	6/28/2018	0.109	0.009	7.49	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A19)	6/28/2018	0.044	0.004	7.99	<4.0	9.6	<1.0
006Q- Runway/ Perimeter Outfall (A21)	6/28/2018	2.299	0.194	7.70	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A23)	6/28/2018	0.203	0.020	7.94	<4.0	10	<1.0
006Q- Runway/ Perimeter Outfall (A33)	6/28/2018	0.150	0.018	8.24	<4.0	8.5	<1.0
006Q- Runway/ Perimeter Outfall (A38)	6/28/2018	0.311	0.024	7.90	<4.0	6.9	<1.0
006Q- Runway/Perimeter Outfall Average		0.483	0.042	7.86	0.0	5.0	0.0
005Q - Northwest Outfall	9/18/2018	0.521	0.073	NS	NS	NS	NS
006Q- Runway/ Perimeter Outfall (A9)	9/18/2018	0.237	0.041	NS	NS	NS	NS
006Q- Runway/ Perimeter Outfall (A16)	9/18/2018	0.104	0.015	NS	NS	NS	NS
006Q- Runway/ Perimeter Outfall (A19)	9/18/2018	0.045	0.006	NS	NS	NS	NS
006Q- Runway/ Perimeter Outfall (A21)	9/18/2018	1.964	0.313	7.2	<4.0	6	<1.0
006Q- Runway/ Perimeter Outfall (A23)	9/18/2018	0.186	0.032	7.32	<4.0	8	<1.0
006Q- Runway/ Perimeter Outfall (A34)	9/18/2018	0.724	0.107	7.02	<4.0	6	<1.0
006Q- Runway/ Perimeter Outfall (A38)	9/18/2018	0.280	0.039	7.07	<4.0	<5.0	<1.0
006Q- Runway/Perimeter Outfall Average		0.506	0.079	7.15	0.0	5.1	0.0
005Q - Northwest Outfall	11/13/2018	0.697	0.141	6.57	<4.0	36	<1.0
006Q- Runway/ Perimeter Outfall (A9)	11/13/2018	0.400	0.096	6.63	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A16)	11/13/2018	0.162	0.033	6.13	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A20)	11/13/2018	0.168	0.040	6.47	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A21)	11/13/2018	3.525	0.700	6.73	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A23)	11/13/2018	0.297	0.073	6.41	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A33)	11/13/2018	0.227	0.062	5.9	<4.0	6.3	<1.0
006Q- Runway/ Perimeter Outfall (A38)	11/13/2018	0.493	0.090	6.78	<4.0	190	<1.0
006Q- Runway/Perimeter Outfall Average		0.753	0.156	6.44	0.0	28	0.0
Discharge Limitations		Report	Report	Report	Report	Report	Report

Source: Massport

Notes: For averaging calculations, a value of zero was employed for those results measures below the laboratory detection limit.
Requirements are from NPDES Permit MA 0000787, issued July 31, 2007.

1 January 2018 wet weather bacteria samples were collected on 1/23/2018.

TSS Total Suspended Solids

Table J-13 Logan Airport January 2018 Wet Weather Deicing Monitoring Results – North, West, Porter Street, and Runway/Perimeter Stormwater Outfalls

	Date	Ethylene Glycol, Total (mg/L)	Propylene Glycol, Total (mg/L)	BOD5 (mg/L)	COD (mg/L)	Ammonia Nitrogen (mg/L)	Nonylphenol (µg/L)	4-Methyl-1-H-benzotriazole (µg/L)	5-Methyl-1-H-benzotriazole (µg/L)	Tolytriazole (µg/L)
001B - North Outfall	1/17/2018	<800	12,400	14,000	28,000	0.733	<0.02	22.67	37.21	59.88
002B - West Outfall	1/17/2018	<400	11,400	13,000	21,000	0.921	<0.02	16.29	17.92	34.21
003B - Porter Street Outfall 1	1/17/2018	2.88	22.9	59	1,300	1.21	<0.02	2.27	3.33	5.60
003B - Porter Street Outfall 2	1/17/2018	9.66	134	220	450	0.087	<0.02	6.73	9.71	16.44
003B - Porter Street Outfall 3	1/17/2018	<2.00	2.96	12	56	0.251	<0.02	<1.00	<1.00	ND
003B - Porter Street Outfall Average		4.18	53	97	602	0.52	0.00	3.00	4.35	7.35
006B- Runway/ Perimeter (A9)	1/17/2018	<2.00	<2.00	7.7	40	0.389	<0.02	3.36	1.08	4.44
006B- Runway/ Perimeter (A15)	1/17/2018	<2.00	<2.00	50	70	0.110	<0.02	3.37	0.62 J	3.99 J
006B- Runway/ Perimeter (A16)	1/17/2018	<2.00	<2.00	17	50	0.457	<0.02	2.68	0.42 J	3.10 J
006B- Runway/ Perimeter (A21)	1/17/2018	<2.00	<2.00	<10	460	0.661	<0.02	3.48	1.13	4.61
006B- Runway/ Perimeter (A23)	1/17/2018	<2.00	<2.00	26	160	1.18	<0.02	8.19	1.58	9.77
006B- Runway/ Perimeter (A33)	1/17/2018	<2.00	<2.00	99	150	3.11	<0.02	10.50	4.60	15.10
006B- Runway/ Perimeter (A38)	1/17/2018	<2.00	<2.00	13	330	0.166	<0.02	<1.00	<1.00	ND
006B- Runway/Perimeter Outfall Average		0.00	0.00	30	180	0.868	0.00	4.51	1.35	5.86
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.										
Discharge Limitations										
Average Monthly		Report	Report	Report	Report	Report	Report	Report	Report	Report
Maximum Daily		Report	Report	Report	Report	Report	Report	Report	Report	Report

Source: Massport

Notes: For averaging calculations, a value of zero was employed for those results measured below the laboratory detection limit.
J = value is an estimate calculated by the lab from the response factors of the other two triazole compounds.
Tolytriazole concentrations calculated as sum of 4-Methly-1-H-benzotriazole and 5-Methyl-1-H-benzotriazole.

BOD5 Five-day Biochemical Oxygen Demand
COD Chemical Oxygen Demand
ND Not Detected

Table J-14 Logan Airport March 2018 Wet Weather Deicing Monitoring Results – North, West, Porter Street, and Runway/Perimeter Stormwater Outfalls

	Date	Ethylene Glycol, Total (mg/L)	Propylene Glycol, Total (mg/L)	BOD5 (mg/L)	COD (mg/L)	Ammonia Nitrogen (mg/L)	Nonylphenol (µg/L)	4-Methyl-1-H-benzotriazole (µg/L)	5-Methyl-1-H-benzotriazole (µg/L)	Tolytriazole (µg/L)
001B - North Outfall	3/22/2018	<200	5,250	5,200	12,000	0.364	<0.02	<1.00	102.21	102.21
002B - West Outfall	3/22/2018	<200	2,970	3,100	5,700	1.460	<0.02	<1.00	20.97	20.97
003B - Porter Street Outfall 1	3/22/2018	2.68	3.8	27	610	1.47	<0.02	<1.00	4.64	4.64
003B - Porter Street Outfall 2	3/22/2018	10.70	5	50	230	<0.075	<0.02	<1.00	11.29	11.29
003B - Porter Street Outfall 3	3/22/2018	<2.00	<2.00	<5.0	95	0.212	<0.02	<1.00	<1.00	ND
003B - Porter Street Outfall Average		4.46	2.99	26	312	0.56	0.00	0.00	5.31	5.31
006B- Runway/ Perimeter (A9)	3/22/2018	5.77	<2.00	340	450	0.881	<0.02	<1.00	49.79	49.79
006B- Runway/ Perimeter (A16)	3/22/2018	6.84	11.1	540	680	<0.075	<0.02	<1.00	17.93	17.93
006B- Runway/ Perimeter (A20)	3/22/2018	<10	261	1,200	2,000	<0.075	<0.02	<1.00	72.08	72.08
006B- Runway/ Perimeter (A21)	3/22/2018	5.91	99.1	1,000	2,900	0.352	<0.02	<1.00	84.95	84.95
006B- Runway/ Perimeter (A23)	3/22/2018	2.57	15.9	830	1,700	0.50	<0.02	<1.00	52.48	52.48
006B- Runway/ Perimeter (A33)	3/22/2018	<10	268	920	2,300	0.149	<0.02	<1.00	26.79	26.79
006B- Runway/ Perimeter (A38)	3/22/2018	<2.00	<2.00	<5.0	140	0.253	<0.02	<1.00	<1.00	ND
006B- Runway/Perimeter Outfall Average		3.01	93.6	690	1,453	0.305	0.00	0.00	43.43	43.43
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.										
Discharge Limitations										
Average Monthly		Report	Report	Report	Report	Report	Report	Report	Report	Report
Maximum Daily		Report	Report	Report	Report	Report	Report	Report	Report	Report

Source: Massport.
Notes: For averaging calculations, a value of zero was employed for those results measured below the laboratory detection limit.
Tolytriazole concentrations calculated as sum of 4-Methly-1-H-benzotriazole and 5-Methyl-1-H-benzotriazole.
BOD5 Five-day Biochemical Oxygen Demand
COD Chemical Oxygen Demand
ND Not Detected

Table J-15 Logan Airport 2019 Monthly Monitoring Results for First Quarter — North, West, and Maverick Street Stormwater Outfalls

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)	*Klebsiella* (cfu/100mL)
001A – North Outfall	1/24/2019	Wet Weather	6.095	0.679	7.76	<4.0	26	<1.0	0.070	40	1,200	NA
002A – West Outfall	1/24/2019	Wet Weather	13.616	1.593	7.39	4.0	36	<1.0	0.090	110	2,800	NA
004A – Maverick Street Outfall	1/24/2019	Wet Weather	1.089	0.071	7.41	5.3	48	<1.0	0.110	40	710	NA
001C – North Outfall	1/15/2019	Dry Weather				<4.0	14	<1.0	0.050	<10	10	NA
002C – West Outfall	1/15/2019	Dry Weather				<4.0	9.0	<1.0	<0.050	90	<10	NA
004C – Maverick Street Outfall	1/15/2019	Dry Weather				<4.0	13	<1.0	<0.050	20	10	NA
001A – North Outfall	2/7/2019	Wet Weather	2.328	0.484	6.73	<4.0	12	<1.0	<0.050	10	350	NA
002A – West Outfall	2/7/2019	Wet Weather	7.438	0.965	6.84	<4.0	30	<1.0	0.090	100	1,400	NA
004A – Maverick Street Outfall	2/7/2019	Wet Weather	0.504	0.035	6.38	<4.0	7.4	<1.0	<0.050	230	260	NA
001C – North Outfall	---	Dry Weather				NS	NS	NS	NS	NS	NS	NS
002C – West Outfall	---	Dry Weather				NS	NS	NS	NS	NS	NS	NS
004C – Maverick Street Outfall	---	Dry Weather				NS	NS	NS	NS	NS	NS	NS
001A – North Outfall	3/22/2019	Wet Weather	2.987	0.623	G	<4.0	16	<1.0	0.080	60	240	NA
002A – West Outfall	3/22/2019	Wet Weather	10.677	1.069	6.44	**19**	**590**	<1.0	0.680	440	440	NA
004A – Maverick Street Outfall	3/22/2019	Wet Weather	0.634	0.036	8.50	<4.0	29	<1.0	0.110	530	290	NA
001C – North Outfall	3/8/2019	Dry Weather				<4.0	24	<1.0	0.070	70	490	NA
002C – West Outfall	3/8/2019	Dry Weather				<4.0	17	<1.0	0.060	70	100	NA
004C – Maverick Street Outfall	3/8/2019	Dry Weather				<4.0	7.0	<1.0	<0.050	40	<10	NA
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.												
Discharge Limitations												
Maximum Daily			Report	Report	6.0 to 8.5	15 mg/L	100 mg/L	Report	Report	Report	Report	
Average Monthly			Report	Report	6.0 to 8.5	—	Report	Report	Report	Report	Report	

Source: Massport.
Notes: Flow rates were estimated for outfalls 001, 002, and 004 by using the SWMM model developed for Logan Airport.
1 *Klebsiella* is an indication of non-fecal coliform bacteria and is tested for at the North Outfall when fecal coliform concentration exceeds 5,000 cfu/100ml.
NA Not Analyzed
NS Not Sampled
G Equipment failure
TSS Total Suspended Solids

Table J-16 Logan Airport 2019 Monthly Monitoring Results for First Quarter — Porter Street Stormwater Outfall

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)
003 - Porter Street Outfall 1	1/24/2019	Wet Weather	---	---	7.98	<4.0	32	<1.0	0.100	50	370
003 - Porter Street Outfall 2	1/24/2019	Wet Weather	---	---	8.06	160	400	<1.0	<0.050	10	70
003 - Porter Street Outfall 3	1/24/2019	Wet Weather	---	---	7.83	14	89	<1.0	0.100	<10	60
003 - Porter Street Outfall Average		Wet Weather	2.501	0.295	7.96	58	174	0.0	0.067	7.9	116
003 - Porter Street Outfall 1	1/15/2019	Dry Weather				<4.0	14	<1.0	0.110	<10	<10
003 - Porter Street Outfall 2	1/15/2019	Dry Weather				<4.0	19	<1.0	<0.050	<10	10
003 - Porter Street Outfall 3	1/15/2019	Dry Weather				<4.0	20	<1.0	0.080	<10	10
003 - Porter Street Outfall Average		Dry Weather				0.0	18	0.0	0.063	1.0	4.6
003 - Porter Street Outfall 1	2/7/2019	Wet Weather	---	---	6.75	<4.0	19	<1.0	0.050	1,900	2,100
003 - Porter Street Outfall 2	2/7/2019	Wet Weather	---	---	6.72	<4.0	43	<1.0	0.050	30	40
003 - Porter Street Outfall 3	2/7/2019	Wet Weather	---	---	6.78	<4.0	<5.0	<1.0	<0.050	<10	30
003 - Porter Street Outfall Average		Wet Weather	1.477	0.188	6.75	<4.0	20.67	0.0	0.033	38.5	136
003 - Porter Street Outfall 1	---	Dry Weather				NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 2	---	Dry Weather				NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 3	---	Dry Weather				NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall Average		Dry Weather				NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 1	3/22/2019	Wet Weather	---	---	6.62	<4.0	36	<1.0	0.120	270	1,100
003 - Porter Street Outfall 2	3/22/2019	Wet Weather	---	---	G	<4.0	13	<1.0	0.090	<10	<10
003 - Porter Street Outfall 3	3/22/2019	Wet Weather	---	---	6.30	<4.0	<5.0	<1.0	0.080	<10	550
003 - Porter Street Outfall Average		Wet Weather	2.404	0.180	6.46	4.0	18	1.0	0.097	30	182
003 - Porter Street Outfall 1	3/8/2019	Dry Weather				<4.0	8.6	<1.0	0.090	<10	<10
003 - Porter Street Outfall 2	3/8/2019	Dry Weather				<4.0	85	<1.0	0.220	<10	<10
003 - Porter Street Outfall 3	3/8/2019	Dry Weather				<4.0	<5.0	<1.0	0.080	<10	10
003 - Porter Street Outfall Average		Dry Weather				4.0	33	1.0	0.130	10	10
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.											
Discharge Limitations											
Maximum Daily			Report	Report	6.0 to 8.5	Report	Report	Report	Report	Report	Report
Average Monthly			Report	Report	6.0 to 8.5	—	Report	Report	Report	Report	Report

Source: Massport.

Notes: Flow rates were estimated for outfalls 001, 002, 003 and 004 by using the SWMM model developed for Logan Airport.
For averaging calculations, a value of zero was employed for those results measured below the laboratory detection limit. For geometric mean calculations (fecal coliform and Enterococcus) a value of 1 was employed for those results measured below the laboratory detection limit. For averaging calculations beginning March 2019, the reporting limit was employed for those results measured below the laboratory detection limit. For geometric mean calculations (fecal coliform and Enterococcus) beginning in March 2019, the reporting limit was employed for those results measured below the laboratory detection limit.

TSS Total Suspended Solids
NS Not Sampled
G Equipment failure

Table J-17 Logan Airport 2019 Monthly Monitoring Results for Second Quarter — North, West, and Maverick Street Stormwater Outfalls

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)	*Klebsiella*[1] (cfu/100mL)
001A – North Outfall	4/26/2019	Wet Weather	7.599	0.713	6.07	<4.0	18	<1.0	0.184	620	570	NA
002A – West Outfall	4/26/2019	Wet Weather	21.949	2.450	6.11	<4.0	14	<1.0	<0.050	610	1,100	NA
004A – Maverick Street Outfall	4/26/2019	Wet Weather	2.066	0.152	6.34	<4.0	10	<1.0	0.254	1,100	410	NA
001C – North Outfall	4/12/2019	Dry Weather				<4.0	19	<1.0	0.110	<10	20	NA
002C – West Outfall	4/12/2019	Dry Weather				<4.0	13	<1.0	0.070	820	50	NA
004C – Maverick Street Outfall	4/12/2019	Dry Weather				<4.0	6.1	<1.0	<0.050	2,600	190	NA
001A – North Outfall	5/28/2019	Wet Weather	2.486	0.296	6.90	<4.0	18	<1.0	0.070	30	40	NA
002A – West Outfall	5/28/2019	Wet Weather	6.131	0.992	6.48	<4.0	10	<1.0	0.070	20	40	NA
004A – Maverick Street Outfall	5/28/2019	Wet Weather	0.600	0.044	6.44	<4.0	<5.0	<1.0	0.080	1,300	1,300	NA
001C – North Outfall	5/9/2019	Dry Weather				<4.0	19	<1.0	0.150	40	60	NA
002C – West Outfall	5/9/2019	Dry Weather				<4.0	17	<1.0	0.080	40	40	NA
004C – Maverick Street Outfall	5/9/2019	Dry Weather				<4.0	<5	<1.0	<0.050	6,500	630	NA
001A – North Outfall	6/6/2019	Wet Weather	4.328	0.478	7.43	<4.0	22	<1.0	0.28	1,600	100	NA
002A – West Outfall	6/6/2019	Wet Weather	13.808	1.730	6.75	<4.0	20	<1.0	0.140	560	460	NA
004A – Maverick Street Outfall	6/6/2019	Wet Weather	1.318	0.106	6.75	<4.0	10	<1.0	<0.050	560	670	NA
001C – North Outfall	6/5/2019	Dry Weather				<4.0	8.1	<1.0	0.130	40	90	NA
002C – West Outfall	6/5/2019	Dry Weather				<4.0	16	<1.0	0.060	780	490	NA
004C – Maverick Street Outfall	6/5/2019	Dry Weather				<4.0	13	<1.0	0.060	20	90	NA
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.												
Discharge Limitations												
Maximum Daily			Report	Report	6.0 to 8.5	15 mg/L	100 mg/L	Report	Report	Report	Report	
Average Monthly			Report	Report	6.0 to 8.5	—	Report	Report	Report	Report	Report	

Source: Massport.
Notes: Flow rates were estimated for outfalls 001, 002, 003 and 004 by using the SWMM model developed for Logan Airport.
1 *Klebsiella* is an indication of non-fecal coliform bacteria and is tested for at the North Outfall when fecal coliform concentration exceeds 5,000 cfu/100ml.
TSS Total Suspended Solids
NA Not Analyzed

Table J-18 Logan Airport 2019 Monthly Monitoring Results for Second Quarter — Porter Street Stormwater Outfall

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)
003 - Porter Street Outfall 1	4/26/2019	Wet Weather	---	---	6.24	<4.0	19	<1.0	0.050	330	2,900
003 - Porter Street Outfall 2	4/26/2019	Wet Weather	---	---	6.46	<4.0	<5.0	<1.0	<0.050	<10	20
003 - Porter Street Outfall 3	4/26/2019	Wet Weather	---	---	6.35	<4.0	12	<1.0	<0.050	<10	290
003 - Porter Street Outfall Average		Wet Weather	3.173	0.476	6.35	4.0	12	1.0	0.050	32	256
003 - Porter Street Outfall 1	4/12/2019	Dry Weather				<4.0	9.3	<1.0	0.110	<10	50
003 - Porter Street Outfall 2	4/12/2019	Dry Weather				<4.0	26	<1.0	0.110	<10	<10
003 - Porter Street Outfall 3	4/12/2019	Dry Weather				<4.0	9.0	<1.0	0.130	<10	20
003 - Porter Street Outfall Average		Dry Weather				4.0	15	1.0	0.117	10	21.5
003 - Porter Street Outfall 1	5/28/2019	Wet Weather	---	---	6.90	<4.0	25	<1.0	0.200	1,200	1,100
003 - Porter Street Outfall 2	5/28/2019	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 3	5/28/2019	Wet Weather	---	---	7.22	<4.0	6.1	<1.0	0.140	20	280
003 - Porter Street Outfall Average		Wet Weather	1.686	0.220	7.06	4.0	15.55	1.0	0.170	155	555
003 - Porter Street Outfall 1	5/9/2019	Dry Weather				<4.0	8.3	<1.0	0.180	<10	30
003 - Porter Street Outfall 2	5/9/2019	Dry Weather				<4.0	5.9	<1.0	0.120	<10	10
003 - Porter Street Outfall 3	5/9/2019	Dry Weather				<4.0	<5.0	<1.0	0.090	<10	10
003 - Porter Street Outfall Average		Dry Weather				4.0	6.0	1.0	0.130	10	14.4
003 - Porter Street Outfall 1	6/6/2019	Wet Weather	---	---	7.04	<4.0	8.3	<1.0	0.190	5,800	1,000
003 - Porter Street Outfall 2	6/6/2019	Wet Weather	---	---	8.04	<4.0	<5.0	<1.0	0.090	<10	80
003 - Porter Street Outfall 3	6/6/2019	Wet Weather	---	---	6.78	<4.0	35	<1.0	0.060	50	540
003 - Porter Street Outfall Average		Wet Weather	3.161	0.394	7.29	4.0	16.1	1.0	0.113	143	351
003 - Porter Street Outfall 1	6/5/2019	Dry Weather				<4.0	11	<1.0	0.100	40	450
003 - Porter Street Outfall 2	6/5/2019	Dry Weather				<4.0	130	<1.0	0.080	<10	10
003 - Porter Street Outfall 3	6/5/2019	Dry Weather				9.4	59	<1.0	0.200	20	100
003 - Porter Street Outfall Average		Dry Weather				5.8	67	1.0	0.127	20	76.6
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.											
Discharge Limitations											
Maximum Daily			Report	Report	6.0 to 8.5	Report	Report	Report	Report	Report	Report
Average Monthly			Report	Report	6.0 to 8.5	—	Report	Report	Report	Report	Report

Source: Massport.

Notes: Flow rates were estimated for outfalls 001, 002, 003 and 004 by using the SWMM model developed for Logan Airport.

For averaging calculations beginning March 2019, the reporting limit was employed for those results measured below the laboratory detection limit. For geometric mean calculations (fecal coliform and Enterococcus) beginning in March 2019, the reporting limit was employed for those results measured below the laboratory detection limit.

TSS Total Suspended Solids

NS Not Sampled

Table J-19 Logan Airport 2019 Monthly Monitoring Results for Third Quarter — North, West, and Maverick Street Stormwater Outfalls

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)	*Klebsiella*[1] (cfu/100mL)
001A – North Outfall	7/12/2019	Wet Weather	4.710	0.629	6.19	<4.0	<5.0	<1.0	0.110	20,000	4,300	NA
002A – West Outfall	7/12/2019	Wet Weather	16.324	2.204	7.11	<4.0	16	<1.0	0.130	5,200	20,000	NA
004A – Maverick Street Outfall	7/12/2019	Wet Weather	1.282	0.132	6.76	<4.0	6.8	<1.0	0.110	>80,000	1,600	NA
001C – North Outfall	7/26/2019	Dry Weather				<4.0	18	<1.0	0.050	4,000	700	NA
002C – West Outfall	7/26/2019	Dry Weather				<4.0	16	<1.0	0.050	9,000	630	NA
004C – Maverick Street Outfall	7/26/2019	Dry Weather				<4.0	9.5	<1.0	0.060	60	100	NA
001A – North Outfall	8/29/2019	Wet Weather	4.368	0.392	7.09	<4.0	<5.0	<1.0	0.070	3,300	9,000	NA
002A – West Outfall	8/29/2019	Wet Weather	17.385	1.427	7.14	<4.0	9.7	<1.0	0.070	7,400	21,000	NA
004A – Maverick Street Outfall	8/29/2019	Wet Weather	1.471	0.108	6.89	<4.0	<5.0	<1.0	0.080	>80,000	3,500	NA
001C – North Outfall	8/5/2019	Dry Weather				<4.0	19	<1.0	0.060	130	40	NA
002C – West Outfall	8/5/2019	Dry Weather				<4.0	8.4	<1.0	0.070	40	380	NA
004C – Maverick Street Outfall	8/5/2019	Dry Weather				<4.0	11	<1.0	<0.050	40	10	NA
001A – North Outfall	---	Wet Weather	3.850	0.224	NS	NS	NS	NS	NS	NS	NS	NS
002A – West Outfall	---	Wet Weather	11.379	0.776	NS	NS	NS	NS	NS	NS	NS	NS
004A – Maverick Street Outfall	---	Wet Weather	0.992	0.039	NS	NS	NS	NS	NS	NS	NS	NS
001C – North Outfall	9/10/2019	Dry Weather				<4.0	6.0	<1.0	0.050	30	60	NA
002C – West Outfall	9/10/2019	Dry Weather				<4.0	7.5	<1.0	0.060	32,000	480	NA
004C – Maverick Street Outfall	9/10/2019	Dry Weather				<4.0	6.8	<1.0	<0.050	300	200	NA
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.												
Discharge Limitations												
Maximum Daily			Report	Report	6.0 to 8.5	15 mg/L	100 mg/L	Report	Report	Report	Report	Report
Average Monthly			Report	Report	6.0 to 8.5	—	Report	Report	Report	Report	Report	Report

Source: Massport.
Notes: Flow rates were estimated for outfalls 001, 002, and 004 by using the SWMM model developed for Logan Airport.
1 *Klebsiella* is an indication of non-fecal coliform bacteria and is tested for at the North Outfall when fecal coliform concentration exceeds 5,000 cfu/100ml.
TSS Total Suspended Solids
NA Not Analyzed
NS Not Sampled

Table J-20 Logan Airport 2019 Monthly Monitoring Results for Third Quarter — Porter Street Stormwater Outfall

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)
003 - Porter Street Outfall 1	7/12/2019	Wet Weather	---	---	6.36	<4.0	8.7	<1.0	0.120	3,000	6,700
003 - Porter Street Outfall 2	7/12/2019	Wet Weather	---	---	6.99	<4.0	<5.0	<1.0	<0.050	50	4,700
003 - Porter Street Outfall 3	7/12/2019	Wet Weather	---	---	6.35	<4.0	68	<1.0	0.170	500	2,500
003 - Porter Street Outfall Average		Wet Weather	3.617	0.479	6.57	4.0	27.23	1.0	0.113	422	4,286
003 - Porter Street Outfall 1	7/26/2019	Dry Weather				<4.0	8.5	<1.0	0.060	730	1,700
003 - Porter Street Outfall 2	7/26/2019	Dry Weather				<4.0	5.4	<1.0	<0.050	<10	<10
003 - Porter Street Outfall 3	7/26/2019	Dry Weather				<4.0	<5.0	<1.0	0.080	<10	<10
003 - Porter Street Outfall Average		Dry Weather				4.0	6.0	1.0	0.063	41.8	55.4
003 - Porter Street Outfall 1	8/29/2019	Wet Weather	---	---	6.97	<4.0	6.8	<1.0	0.070	7,900	22,000
003 - Porter Street Outfall 2	8/29/2019	Wet Weather	---	---	7.18	<4.0	<5.0	<1.0	<0.050	70	140
003 - Porter Street Outfall 3	8/29/2019	Wet Weather	---	---	6.59	<4.0	<5.0	<1.0	0.080	360	3,500
003 - Porter Street Outfall Average		Wet Weather	2.463	0.288	6.91	4.0	5.6	1.0	0.067	584	2,209
003 - Porter Street Outfall 1	8/5/2019	Dry Weather				<4.0	31	<1.0	0.100	3,500	550
003 - Porter Street Outfall 2	8/5/2019	Dry Weather				<4.0	17	<1.0	<0.050	<10	<10
003 - Porter Street Outfall 3	8/5/2019	Dry Weather				<4.0	7.1	<1.0	0.120	10	60
003 - Porter Street Outfall Average		Dry Weather				4.0	18	1.0	0.090	70	69
003 - Porter Street Outfall 1	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 2	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 3	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall Average		Wet Weather	2.204	0.170	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 1	9/10/2019	Dry Weather				<4.0	20	<1.0	0.050	180	2,100
003 - Porter Street Outfall 2	9/10/2019	Dry Weather				<4.0	<5.0	<1.0	<0.050	100	180
003 - Porter Street Outfall 3	9/10/2019	Dry Weather				<4.0	7.0	<1.0	0.080	30	550
003 - Porter Street Outfall Average		Dry Weather				4.0	11	1.0	0.060	81	592
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.											
Discharge Limitations											
Maximum Daily			Report	Report	6.0 to 8.5	Report	Report	Report	Report	Report	Report
Average Monthly			Report	Report	6.0 to 8.5	—	Report	Report	Report	Report	Report

Source: Massport.

Notes: Flow rates were estimated for outfall 003 by using the SWMM model developed for Logan Airport.
For averaging calculations beginning March 2019, the reporting limit was employed for those results measured below the laboratory detection limit. For geometric mean calculations (fecal coliform and Enterococcus) beginning in March 2019, the reporting limit was employed for those results measured below the laboratory detection limit.

TSS Total Suspended Solids

NS Not Sampled

Table J-21 Logan Airport 2019 Monthly Monitoring Results for Fourth Quarter — North, West, and Maverick Street Stormwater Outfalls

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)	*Klebsiella*[1] (cfu/100mL)
001A – North Outfall	10/23/2019	Wet Weather	4.800	0.432	7.21	<4.0	7.1	<1.0	0.060	3,400	23,000	NA
002A – West Outfall	10/23/2019	Wet Weather	14.612	1.513	7.54	<4.0	7.5	<1.0	0.120	730	18,000	NA
004A – Maverick Street Outfall	10/23/2019	Wet Weather	1.067	0.089	6.95	<4.0	6.7	<1.0	0.060	1,700	690	NA
001C – North Outfall	10/1/2019	Dry Weather				<4.0	14.0	<1.0	0.140	400	620	NA
002C – West Outfall	10/1/2019	Dry Weather				<4.0	11.0	<1.0	0.090	110	260	NA
004C – Maverick Street Outfall	10/1/2019	Dry Weather				<4.0	8.2	<1.0	0.050	5,500	460	NA
001A – North Outfall	---	Wet Weather	5.168	0.351	NS	NS	NS	NS	NS	NS	NS	NS
002A – West Outfall	---	Wet Weather	16.125	1.235	NS	NS	NS	NS	NS	NS	NS	NS
004A – Maverick Street Outfall	---	Wet Weather	1.164	0.064	NS	NS	NS	NS	NS	NS	NS	NS
001C – North Outfall	11/4/2019	Dry Weather				<4.0	6.7	<1.0	0.050	60	30	NA
002C – West Outfall	11/4/2019	Dry Weather				<4.0	8.1	<1.0	0.070	270	60	NA
004C – Maverick Street Outfall	11/4/2019	Dry Weather				<4.0	7.8	<1.0	0.050	<10	10	NA
001A – North Outfall	12/9/2019	Wet Weather	4.549	0.869	7.26	6.1	30	<2.0	0.150	500	2,200	NA
002A – West Outfall	12/9/2019	Wet Weather	16.512	2.334	7.40	4.1	74	<1.0	0.080	550	1,500	NA
004A – Maverick Street Outfall	12/9/2019	Wet Weather	1.136	0.133	7.39	<4.0	16	<1.0	0.070	270	420	NA
001C – North Outfall	12/20/2019	Dry Weather				<4.0	24.0	<5.0	0.080	40	70	NA
002C – West Outfall	12/20/2019	Dry Weather				<4.0	15.0	<2.0	0.070	<10	<10	NA
004C – Maverick Street Outfall	12/20/2019	Dry Weather				<4.0	30	<1.0	<0.050	<10	<10	NA
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.												
Discharge Limitations												
Maximum Daily			Report	Report	6.0 to 8.5	15 mg/L	100 mg/L	Report	Report	Report	Report	Report
Average Monthly			Report	Report	6.0 to 8.5	–	Report	Report	Report	Report	Report	Report

Source: Massport.
Notes: Flow rates were estimated for outfalls 001, 002, and 004 by using the SWMM model developed for Logan Airport.
1 *Klebsiella* is an indication of non-fecal coliform bacteria and is tested for at the North Outfall when fecal coliform concentration exceeds 5,000 cfu/100ml.
TSS Total Suspended Solids
NA Not Analyzed
NS Not Sampled

Table J-22 Logan Airport 2019 Monthly Monitoring Results for Fourth Quarter — Porter Street Stormwater Outfall

	Date	Event	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (S.U.)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)	Surfactants (mg/L)	Fecal Coliform (cfu/100mL)	*Enterococcus* (cfu/100mL)
003 - Porter Street Outfall 1	10/23/2019	Wet Weather	---	---	7.95	<4.0	18	<1.0	0.060	1,100	6,400
003 - Porter Street Outfall 2	10/23/2019	Wet Weather	---	---	7.02	<4.0	<5.0	<1.0	<0.050	280	80
003 - Porter Street Outfall 3	10/23/2019	Wet Weather	---	---	7.19	<4.0	<5.0	<1.0	0.080	30	1,100
003 - Porter Street Outfall Average		Wet Weather	3.171	0.322	7.39	4.0	9.3	1.0	0.063	210	826
003 - Porter Street Outfall 1	10/1/2019	Dry Weather				<4.0	18	<1.0	0.150	150	1,000
003 - Porter Street Outfall 2	10/1/2019	Dry Weather				<4.0	<5.0	<1.0	0.060	<10	250
003 - Porter Street Outfall 3	10/1/2019	Dry Weather				<4.0	<5.0	<1.0	0.070	30	660
003 - Porter Street Outfall Average		Dry Weather				4.0	9.0	1.0	0.093	35.6	548
003 - Porter Street Outfall 1	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 2	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 3	---	Wet Weather	---	---	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall Average		Wet Weather	0.256	3.423	NS	NS	NS	NS	NS	NS	NS
003 - Porter Street Outfall 1	11/4/2019	Dry Weather				<4.0	45	<1.0	0.090	150	40
003 - Porter Street Outfall 2	11/4/2019	Dry Weather				<4.0	36	<1.0	<0.050	330	70
003 - Porter Street Outfall 3	11/4/2019	Dry Weather				<4.0	<5.0	<1.0	0.090	<10	150
003 - Porter Street Outfall Average		Dry Weather				4.0	29	1.0	0.077	79	75
003 - Porter Street Outfall 1	12/9/2019	Wet Weather	---	---	6.98	4.1	120	<1.0	0.110	>80,000	3,800
003 - Porter Street Outfall 2	12/9/2019	Wet Weather	---	---	8.04	6.5	15	<1.0	0.060	20	360
003 - Porter Street Outfall 3	12/9/2019	Wet Weather	---	---	7.77	<4.0	7	<1.0	<0.050	70	650
003 - Porter Street Outfall Average		Wet Weather	3.528	0.456	7.60	4.9	47.4	1.0	0.073	482	962
003 - Porter Street Outfall 1	12/20/2019	Dry Weather				<4.0	28	<1.0	0.110	1,600	330
003 - Porter Street Outfall 2	12/20/2019	Dry Weather				5.9	20	<1.0	0.090	<10	<10
003 - Porter Street Outfall 3	12/20/2019	Dry Weather				<4.0	8.7	<1.0	0.090	<10	<10
003 - Porter Street Outfall Average		Dry Weather				4.6	19	1.0	0.097	54	32
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.											
Discharge Limitations											
Maximum Daily			Report	Report	6.0 to 8.5	Report	Report	Report	Report	Report	Report
Average Monthly			Report	Report	6.0 to 8.5	—	Report	Report	Report	Report	Report

Source: Massport.

Notes: Flow rates were estimated for outfall 003 by using the SWMM model developed for Logan Airport.

For averaging calculations beginning March 2019, the reporting limit was employed for those results measured below the laboratory detection limit. For geometric mean calculations (fecal coliform and Enterococcus) beginning in March 2019, the reporting limit was employed for those results measured below the laboratory detection limit.

TSS Total Suspended Solids

NS Not Sampled

Table J-23 Logan Airport 2019 Quarterly Wet Weather Monitoring Results – North, West, Maverick Street, and Porter Street Stormwater Outfalls

	Date	pH (S.U.)	Benzo(a)-anthracene (µg/L)	Benzo(a)-pyrene (µg/L)	Benzo(b)-fluoranthene (µg/L)	Benzo(k)-fluoranthene (µg/L)	Chrysene (µg/L)	Dibenzo(a,h,)-anthracene (µg/L)	Indeno(1,2,3-cd)-pyrene (µg/L)	Naphthalene (µg/L)	Total PAHs (µg/L)
001Q - North Outfall	3/22/2019	G	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
002Q - West Outfall	3/22/2019	6.44	<20	20	37	<20	25	<20	21	<20	103.0
004Q - Maverick Street Outfall	3/22/2019	8.50	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
003Q - Porter Street Outfall 1	3/22/2019	6.62	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
003Q - Porter Street Outfall 2	3/22/2019	G	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
003Q - Porter Street Outfall 3	3/22/2019	6.30	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
003Q - Porter Street Outfall Average		6.46	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
001Q - North Outfall	6/6/2019	7.43	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
002Q - West Outfall	6/6/2019	6.75	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
004Q - Maverick Street Outfall	6/6/2019	6.75	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
003Q - Porter Street Outfall 1	6/6/2019	7.04	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
003Q - Porter Street Outfall 2	6/6/2019	8.04	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
003Q - Porter Street Outfall 3	6/6/2019	6.78	3.5	2.7	3.9	<2.0	3.1	<2.0	<2.0	<2.0	13.2
003Q - Porter Street Outfall Average		7.29	2.5	2.2	2.6	2.0	2.4	2.0	2.0	2.0	5.7
001Q - North Outfall	10/23/2019	7.21	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
002Q - West Outfall	10/23/2019	7.54	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
004Q - Maverick Street Outfall	10/23/2019	6.95	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
003Q - Porter Street Outfall 1	10/23/2019	7.95	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
003Q - Porter Street Outfall 2	10/23/2019	7.02	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
003Q - Porter Street Outfall 3	10/23/2019	7.19	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
003Q - Porter Street Outfall Average		7.39	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.											
Discharge Limitations											
Maximum Daily		6.0 to 8.5	Report	Report	Report	Report	Report	Report	Report	Report	Total

Source: Massport
Notes: For averaging calculations starting March 2019, the reporting limit was employed for those results measured below the laboratory detection limit.
PAHs Polynuclear Aromatic Hydrocarbons
G Equipment failure

Table J-24 Logan Airport 2019 Quarterly Wet Weather Monitoring Results – Northwest and Runway/Perimeter Stormwater Outfalls

	Date	Maximum Daily Flow (MGD)	Average Monthly Flow (MGD)	pH (SU)	Oil and Grease (mg/L)	TSS (mg/L)	Benzene (µg/L)
005Q - Northwest Outfall	3/22/2019	0.361	0.033	7.29	<4.0	36	<1.0
006Q- Runway/ Perimeter Outfall (A9)	3/22/2019	0.282	0.033	G	<4.0	5.4	<1.0
006Q- Runway/ Perimeter Outfall (A16)	3/22/2019	0.095	0.010	G	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A19)	3/22/2019	0.039	0.004	G	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A21)	3/22/2019	2.172	0.232	G	<4.0	7.5	<1.0
006Q- Runway/ Perimeter Outfall (A23)	3/22/2019	0.235	0.025	G	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A33)	3/22/2019	0.175	0.025	G	<4.0	9.2	<1.0
006Q- Runway/ Perimeter Outfall (A38)	3/22/2019	0.279	0.029	G	<4.0	17	<1.0
006Q- Runway/Perimeter Outfall Average		0.468	0.051	G	4.0	7.7	1.0
005Q - Northwest Outfall	6/6/2019	0.779	0.071	NS	NS	NS	NS
006Q- Runway/ Perimeter Outfall (A9)	6/6/2019	0.227	0.039	6.01	<4.0	5.5	<1.0
006Q- Runway/ Perimeter Outfall (A10)	6/6/2019	0.494	0.049	7.25	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A15)	6/6/2019	0.173	0.017	8.05	<4.0	10	<1.0
006Q- Runway/ Perimeter Outfall (A21)	6/6/2019	2.772	0.329	7.26	<4.0	5.2	<1.0
006Q- Runway/ Perimeter Outfall (A23)	6/6/2019	0.170	0.028	7.39	<4.0	6.7	<1.0
006Q- Runway/ Perimeter Outfall (A34)	6/6/2019	1.340	0.137	7.09	<4.0	10	<1.0
006Q- Runway/ Perimeter Outfall (A40)	6/6/2019	3.924	0.398	6.74	<4.0	7	<1.0
006Q- Runway/Perimeter Outfall Average		1.300	0.142	7.11	4.0	7.1	1.0
005Q - Northwest Outfall	10/23/2019	0.637	0.057	6.92	<4.0	13	<1.0
006Q- Runway/ Perimeter Outfall (A8)	10/23/2019	0.357	0.030	7.53	<4.0	5.5	<1.0
006Q- Runway/ Perimeter Outfall (A21)	10/23/2019	2.856	0.227	7.61	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A22)	10/23/2019	1.547	0.124	7.20	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A23)	10/23/2019	0.253	0.024	7.46	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A31)	10/23/2019	0.241	0.020	7.43	<4.0	6.0	<1.0
006Q- Runway/ Perimeter Outfall (A34)	10/23/2019	1.046	0.093	7.76	<4.0	<5.0	<1.0
006Q- Runway/ Perimeter Outfall (A38)	10/23/2019	0.401	0.029	6.38	<4.0	<5.0	<1.0
006Q- Runway/Perimeter Outfall Average		0.957	0.078	7.34	4.0	5.2	1.0
Discharge Limitations		Report	Report	Report	Report	Report	Report

Source: Massport
Notes: For averaging calculations starting March 2019, the reporting limit was employed for those results measured below the laboratory detection limit.
Requirements are from NPDES Permit MA 0000787, issued July 31, 2007.
TSS Total Suspended Solids
G Equipment failure
NS Not sampled

Table J-25 Logan Airport February 2019 Wet Weather Deicing Monitoring Results – North, West, Porter Street, and Runway/Perimeter Stormwater Outfalls

	Date	Ethylene Glycol, Total (mg/L)	Propylene Glycol, Total (mg/L)	BOD5 (mg/L)	COD (mg/L)	Ammonia Nitrogen (mg/L)	Nonylphenol (µg/L)	4-Methyl-1-H-benzotriazole (µg/L)	5-Methyl-1-H-benzotriazole (µg/L)	Tolytriazole (µg/L)
001B - North Outfall	2/12/2019	<2.00	<2.00	120	210	1.93	<0.02	25.42	22.71	48.13
002B - West Outfall	2/12/2019	<2.00	<2.00	57	200	1.71	0.472	20.25	15.91	36.16
003B - Porter Street Outfall 1	2/12/2019	<2.00	<2.00	<50	770	1.78	1.380	2.66	2.61	5.27
003B - Porter Street Outfall 2	2/12/2019	<2.00	6.20	150	210	0.096	<0.02	39.47	90.16	129.63
003B - Porter Street Outfall 3	2/12/2019	<2.00	<2.00	<2.0	48	1.81	<0.02	<2.50	<2.50	ND
003B - Porter Street Outfall Average	2/12/2019	0.00	2.07	50	343	1.23	0.46	14.04	30.92	44.97
006B- Runway/ Perimeter (A9)	2/21/2019	<2.00	<2.00	11	34	0.619	<0.04	2.17	0.90 J	3.07
006B- Runway/ Perimeter (A15)	2/21/2019	<2.00	<2.00	5.1	65	0.258	<0.02	1.56	<2.50	1.56
006B- Runway/ Perimeter (A21)	2/21/2019	<2.00	<2.00	11	99	1.04	<0.02	2.81	0.63 J	3.44
006B- Runway/ Perimeter (A22)	2/21/2019	<2.00	<2.00	12	38	2.46	<0.02	4.05	0.80 J	4.85
006B- Runway/ Perimeter (A26)	2/21/2019	<2.00	<2.00	10	24	0.569	<0.02	3.12	0.54 J	3.66
006B- Runway/ Perimeter (A34)	2/21/2019	<2.00	<2.00	12	72	3.54	NA	NA	NA	NA
006B- Runway/ Perimeter (A38)	2/21/2019	<2.00	<2.00	<2.0	52	0.365	<0.04	<2.50	<2.50	ND
006B- Runway/Perimeter Outfall Average		0.00	0.00	8.7	55	1.26	0.00	2.29	0.48	2.76
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.										
Discharge Limitations										
Average Monthly		Report	Report	Report	Report	Report	Report	Report	Report	Report
Maximum Daily		Report	Report	Report	Report	Report	Report	Report	Report	Report

Source: Massport
Notes: For averaging calculations, a value of zero was employed for those results measured below the laboratory detection limit.
J = value is an estimate calculated by the lab from the response factors of the other two triazole compounds.
Tolytriazole concentrations calculated as sum of 4-Methly-1-H-benzotriazole and 5-Methyl-1-H-benzotriazole.
BOD5 Five-day Biochemical Oxygen Demand
COD Chemical Oxygen Demand
ND Not Detected
NA Not Analyzed

Table J-26 Logan Airport February 2019 Wet Weather Deicing Monitoring Results – North, West, Porter Street, and Runway/Perimeter Stormwater Outfalls

	Date	Ethylene Glycol, Total (mg/L)	Propylene Glycol, Total (mg/L)	BOD5 (mg/L)	COD (mg/L)	Ammonia Nitrogen (mg/L)	Nonylphenol (µg/L)	4-Methyl-1-H-benzotriazole (µg/L)	5-Methyl-1-H-benzotriazole (µg/L)	Tolytriazole (µg/L)
001B - North Outfall	2/28/2019	<400	11,800	5,700	26,000	0.50	<0.02	15.90	18.18	34.08
002B - West Outfall	2/28/2019	<400	17,000	48,000	49,000	1.23	<0.02	19.22	17.96	37.18
003B - Porter Street Outfall 1	2/28/2019	<2.00	45.3	67	1,400	1.99	<0.02	6.83	7.34	14.17
003B - Porter Street Outfall 2	2/28/2019	<20.0	507	810	1,700	0.358	<0.02	13.01	15.82	28.83
003B - Porter Street Outfall 3	2/28/2019	<100	2,480	2,100	6,300	0.662	<0.02	5.04	5.16	10.20
003B - Porter Street Outfall Average		0.0	1,011	992	3,133	1.00	0.00	8.29	9.44	17.73
006B- Runway/ Perimeter (A9)	2/28/2019	<2.00	2.4	33	62	0.54	<0.02	7.12	5.28	12.40
006B- Runway/ Perimeter (A14)	2/28/2019	<2.00	<2.00	39	140	6.900	<0.02	23.18	10.47	33.65
006B- Runway/ Perimeter (A15)	2/28/2019	<2.00	<2.00	4.3	<20	0.314	<0.02	6.51	<2.50	6.51
006B- Runway/ Perimeter (A21)	2/28/2019	<2.00	<2.00	24	100	1.12	<0.04	3.26	2.49	5.75
006B- Runway/ Perimeter (A22)	2/28/2019	<2.00	<2.00	17	220	2.04	<0.02	9.02	5.59	14.61
006B- Runway/ Perimeter (A34)	2/28/2019	<2.00	<2.00	36	74	3.28	<0.02	12.77	6.75	19.52
006B- Runway/ Perimeter (A38)	2/28/2019	<2.00	<2.00	<2.0	67	0.289	<0.02	<2.50	<2.50	ND
006B- Runway/Perimeter Outfall Average	2/28/2019	0.00	0.34	21.9	95	2.07	0.00	8.84	4.37	13.21
Requirements are from NPDES Permit MA0000787, issued July 31, 2007.										
Discharge Limitations										
Average Monthly		Report	Report	Report	Report	Report	Report	Report	Report	Report
Maximum Daily		Report	Report	Report	Report	Report	Report	Report	Report	Report

Source: Massport.
Notes: For averaging calculations, a value of zero was employed for those results measured below the laboratory detection limit.
Tolytriazole concentrations calculated as sum of 4-Methly-1-H-benzotriazole and 5-Methyl-1-H-benzotriazole.
BOD5 Five-day Biochemical Oxygen Demand
COD Chemical Oxygen Demand
ND Not Detected

Table J-27 Logan Airport Stormwater Outfall NPDES Water Quality Monitoring Results – 1993 to 2019

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
# / # = Number of samples at or below NPDES limits / Total number of samples taken[1]																							
Oil and Grease (mg/L)																							
North Outfall	30/31	35/36	33/35	29/35	30/35	35/36	29/30	34/36	28/28	36/36	30/32	32/34	33/35	33/33	29/29	23/23	24/24	24/24	24/24	21/21	20/20	21/21	19/20
West Outfall	29/30	36/36	34/34	36/36	34/35	36/36	30/30	35/35	27/28	36/36	31/32	33/34	35/35	32/33	28/28	22/23	24/24	24/24	22/24	21/21	21/21	21/21	19/19
Maverick Street Outfall	29/29	36/36	35/35	36/36	35/35	35/36	30/30	34/34	26/28	35/36	32/32	34/34	35/35	32/33	29/29	22/23	20/21	19/19	23/23	15/15	4/4	20/20	18/18
Settable Solids[2] (mg/L)																							
North Outfall	19/19	34/35	34/35	32/35	31/34	34/36	30/30	34/36	29/29	32/36	32/32	34/34	33/35	32/34	22/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
West Outfall	19/19	32/36	34/34	35/36	34/34	35/36	29/30	36/36	27/28	36/36	31/32	34/34	32/35	33/33	22/22	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
TSS (mg/L)																							
North Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6/6	24/24	24/24	22/23	24/24	21/21	20/21	21/21	20/20
West Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5/6	24/24	24/24	23/23	22/24	20/22	21/21	20/21	18/19
Maverick Street Outfall	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4/6	22/24	20/21	18/19	20/23	14/15	4/4	19/20	18/18
pH																							
North Outfall	34/35	33/36	35/35	35/35	35/35	36/36	30/30	36/36	29/29	36/36	32/32	34/34	35/35	34/34	26/26	12/12	16/16	11/11	12/12	9/9	8/8	8/8	8/8
West Outfall	34/34	28/36	33/34	35/36	35/35	36/36	30/30	36/36	29/29	36/36	32/32	34/34	35/35	33/33	26/26	12/12	16/16	11/11	12/12	9/9	9/9	8/8	8/8
Porter Street Outfall	35/35	30/36	34/34	36/36	35/35	36/36	30/30	36/36	28/28	36/36	32/32	34/34	35/35	33/33	22/22	21/21	48/48	24/24	23/23	26/27	24/27	24/24	19/23
Maverick Street Outfall	35/35	35/36	35/35	36/36	34/35	36/36	30/30	35/35	28/28	36/36	32/32	34/34	35/35	33/33	26/26	10/10	16/16	10/10	11/11	6/6	2/2	7/7	7/7

Table J-27 Logan Airport Stormwater Outfall NPDES Water Quality Monitoring Results – 1993 to 2019 (Continued)

	2016	2017	2018	2019
# / # = Number of samples at or below NPDES limits / Total number of samples taken[1]				
Oil and Grease (mg/L)				
North Outfall	23/23	23/23	21/21	21/21
West Outfall	23/23	22/22	20/21	19/20
Maverick Street Outfall	23/23	23/23	21/21	21/21
Settable Solids[2] (mg/L)				
North Outfall	N/A	N/A	N/A	N/A
West Outfall	N/A	N/A	N/A	N/A
TSS (mg/L)				
North Outfall	23/23	23/23	19/21	21/21
West Outfall	23/23	22/22	21/21	20/21
Maverick Street Outfall	22/23	23/23	19/21	21/21
pH				
North Outfall	10/11	8/8	9/9	9/9
West Outfall	11/11	7/7	9/9	10/10
Porter Street Outfall	33/33	33/33	27/27	28/28
Maverick Street Outfall	10/11	8/8	9/9	10/10

Source: Massport

Notes: Sampling requirements changed in 2007 with the issuance of a new NPDES permit. Results through 2007 are based on NPDES Permit MA0000787, issued March 1, 1978. Stormwater outfall water quality monitoring results collected in accordance with the requirements of former NPDES permit. A portion of the Porter Street Drainage Area was incorporated into the West Drainage Area as part of roadway construction projects at Logan Airport.

N/A Not Analyzed

1 The total number of samples at each outfall varies year to year. In some years, fewer samples are taken due to factors such as construction, weather, and/or tidal conditions.

2 Settleable solids analyses were replaced with TSS in 2008.

Table J-28 Logan Airport Oil and Hazardous Material Spills[1] and Jet Fuel Handling – 1990 to 2019

Year	Total Number of all Spills	Total Number of all Spills >10 gallons	Total Volume of all Spills (Gallons)	Estimated Volume of Jet Fuel Handled (Gallons)	Total Volume of Jet Fuel Spilled (Gallons)
1990	173	N/A	N/A	438,100,000	3,745
1991	186	N/A	N/A	N/A	2,471
1992	195	N/A	N/A	N/A	4,355
1993	188	N/A	N/A	451,900,000	3,131
1994	217	N/A	N/A	476,700,000	4,046
1995	161	N/A	N/A	309,200,000	21,412[2]
1996	159	N/A	N/A	346,700,000	1,321
1997	147	N/A	N/A	377,488,161	2,029[3]
1998	191	N/A	N/A	387,224,004	10,047[4]
1999	196	43	7,151	425,937,051	7,012[5]
2000	136	20	1,318	441,901,932	1,227
2001	139	37	1,924	416,748,819	1,771
2002	101	16	653	358,190,362	559
2003	128	19	10,364	319,439,910	10,188[6]
2004	126	18	894	373,996,141	574
2005	97	15	2,319	368,645,932	585
2006	92	11	752	364,450,864	644
2007	108	7	604	367,585,187	361
2008	99	20	944	345,631,788	662
2009	95	6	1004	327,358,619	915
2010	87	15	476	335,693,997	360
2011	108	12	572	340,421,373	337
2012	132	5	593	343,731,127	439
2013	94	6	452	349,397,940	351
2014	129	17	2,785	370,222,342	785
2015	196	16	1,278	374,985,216	885
2016	231	14	1,158	456,003,328	558
2017	176	8	2,310[7]	472,229,047	315

Table J-28 Logan Airport Oil and Hazardous Material Spills[1] and Jet Fuel Handling – 1990 to 2019 (Continued)

Year	Total Number of all Spills	Total Number of all Spills >10 gallons	Total Volume of all Spills (Gallons)	Estimated Volume of Jet Fuel Handled (Gallons)	Total Volume of Jet Fuel Spilled (Gallons)
2018	189	8	7,660	521,056,895	7,383
2019	152	22	799	542,314,657	514

Source: Massport Fire-Rescue Department.
Notes:
N/A Not available.
1 Materials include: jet fuel, hydraulic oil, diesel fuel, gasoline, and other materials such as glycol and paint.
2 One tenant spill, which occurred on October 15, 1995, totaled 18,000 gallons (84 percent of the annual spill total). The spill did not enter the Airport's storm drain system.
3 On October 23, 1997, a fuel line on an aircraft failed, resulting in the release of approximately 2,500 gallons, all but 60 gallons of which were recovered in drums before reaching the ground. Only the 60 gallons is included in the 1997 total.
4 Includes a 7,200-gallon spill that was discovered on September 2, 1998, and a 1,300-gallon spill that occurred on June 3, 1998. Neither spill entered the Airport's storm drain system.
5 Includes a 5,000-gallon spill, none of which entered the Airport's storm drainage system.
6 In 2003, one fuel spill comprised 9,460 gallons or 94 percent of the total volume of the MassDEP/MCP reportable spills that year. The fuel spill was contained and did not enter the drainage system.
7 Includes 1,750 gallons of deicing fluid.

Table J-29 Type and Quantity of Oil and Hazardous Material Spills at Logan Airport – 1999 to 2019

	Jet Fuel			Hydraulic Oil			Diesel Fuel			Gasoline			Other		
Year	No. of Spills	Quantity (Gallons)	No. of Spills ≥ 10 Gallons	No. of Spills	Quantity (Gallons)	No. of Spills ≥ 10 Gallons	No. of Spills	Quantity (Gallons)	No. of Spills ≥ 10 Gallons	No. of Spills	Quantity (Gallons)	No. of Spills ≥ 10 Gallons	No. of Spills	Quantity (Gallons)	No. of Spills ≥ 10 Gallons
1999	151	7,012	40	24	67	1	13	49	2	5	7	0	3	16	0
2000	115	1,227	18	8	59	2	3	11	0	8	16	0	2	5	0
2001	104	1,771	32	21	92	3	5	30	1	6	26	1	3	5	0
2002	79	559	15	7	38	0	8	37	18	4	8	0	3	11	0
2003	89	10,188	15	15	91	3	15	30	0	7	24	0	2	31	1
2004	82	574	12	17	189	4	14	52	0	7	26	0	6[1]	53[2]	2[3]
2005	66	585	12	14	78	1	7	1,610	2	7	45	0	3[4]	1	0
2006	65	644	9	10	25	0	6	57	1	4	9	0	7	17	1
2007	66	361	4	16	37	0	16	57	1	3	8	0	7	141[5]	2
2008	74	662	19	15	56	2	5	14	0	1	7	0	4	205[6]	1
2009	95	915	6	21	51	0	9	20	0	3	3	0	11	15	0
2010	54	360	12	17	50	1	5	56	2	2	3	0	7	7	0
2011	69	337	10	21	149	1	7	55	1	4	16	0	7	15	0
2012	80	439	4	25	79	1	17	38	0	2	12	0	8	25	0
2013	56	351	5	15	51	0	13	32	0	2	<2	0	7	10	0
2014	81	785	13	24	98	1	17	1,810	2	4	9	0	3	83	1
2015	110	885	10	43	149	3	16	151	2	7	46	1	20	47	0
2016	94	558	8	73	224	4	30	300	2	6	12	0	28	64	0
2017	103	315	5	36	101	1	13	59	2	4	14	0	20	1,821[7]	0
2018	111	7,383[8]	6	39	93	0	14	127	2	2	5	0	23	52	0
2019	77	514	17	41	156	3	13	57	1	9	41	1	12	31	0

Source: Massport
1 Includes two Unknown spills (14 gallons), plus one spill of each of the following: Ethylene Glycol, Propylene Glycol, AVGAS, and Paint.
2 Ethylene Glycol (25 gallons), Propylene Glycol (10 gallons), AVGAS (1 gallon) and Paint (3 gallons).
3 One spill of Ethylene Glycol; one spill of Propylene Glycol.
4 Includes two spills of an unknown substance and volume.
5 Includes one spill of motor oil (4 gallons); one spill of kerosene (5 gallons); one spill of cooking oil (120 gallons); one spill of fuel oil (10 gallons); one spill from a battery (1 gallon); two spills of an unknown substance (1 gallon).
6 Includes one spill of transformer oil (200 gallons).
7 Includes 1,750 gallons of deicing fluid (vehicle accident).
8 7,000 gallons of jet fuel were released during a construction related incident involving a fuel hydrant installation project.

Table J-30 Massport Contingency Plan (MCP) Closed Sites at Logan Airport

Location (RTN) and MassDEP Reporting Status	Action/Status
1. North Outfall (3-4837) – CLOSED 12/27/2012	
Phase II and Phase III Reports filed in March 1997	Indicated petroleum contamination present at the site was likely the result of decades of airport operation; risk assessment reported no significant risk to human health, or to the aquatic and avian community.
RAO submitted in March 1998	Class C RAO using a Temporary Solution (periodic site monitoring and assessment); remediation steps included (not limited to) installation of a new fuel distribution system and decommissioning of certain fuel lines, and natural biodegradation processes; goal is to have petroleum contamination reduced to an area less than 1,000 square feet. Installation of the new fuel distribution system and decommissioning of sections of the old system were completed. Massport initiated site evaluation to document the reduction of petroleum contamination following the decommissioning of the North Fuel Farm and fuel distribution system.
Post Class C RAO evaluation report submitted in December 2002	Massport has eliminated substantial hazards at this site and submitted a Class C RAO statement. In accordance with applicable regulations, Massport will conduct a periodic evaluation at five-year intervals until a Permanent Solution has been achieved. The next periodic evaluation was scheduled for 2007.
2004	Evaluation report indicated that a "Condition of No Significant Risk" has not been achieved at this site. Massport scheduled another assessment in 2007.
2005	No change in status for 2005.
2006	Massport prepared the five-year review of the Class C RAO for this site, which was due in December 2007.
2007	Massport completed its five-year review of the Class C RAO and transmitted it to MassDEP in December 2007. It was determined that a "Condition of No Significant Risk" has not been achieved at this site at this time. The next five-year re-evaluation will be conducted in 2012.
2008	No change in status.
2009	No change in status.
2010	No change in status.
2011	No change in status. Massport provided updated data for the MassDEP website.
2012	Response Action Outcome submitted to MassDEP on December 27, 2012. No further MCP response action is required.
2. Former Robie Park (3-10027) - CLOSED 09/21/2016	
2005	A Phase I was completed in 2005 with a RAO retraction. The RAO had been completed by the former property owner.
2006	No change in status for 2006.
2007	No change in status for 2007.
2008	A Phase II Scope of Work was prepared on May 9, 2008. A RAM Plan was submitted to MassDEP on September 16, 2008.
2009	A Phase V Remedy Operation Status Plan was submitted on March 31, 2010.
2010	Two Remedy Operation Status Reports were submitted on September 29, 2010 and March 28, 2011. The next status report was scheduled for September 30, 2011.
2011	Phase IV Project Status Reports 2 and 3 were submitted in March and September 2011, respectively.
2012	Phase V Status Reports 4 and 5 were submitted in March and September 2012, respectively.
2013	Phase V Status Reports 6 and 7 were submitted in March and September 2013, respectively.
2014	Phase V Status Reports 8 and 9 were submitted in March and September 2014, respectively.
2015	Phase V Reports 10 and 11 were submitted in March and September 2015, respectively.
2016	A Permanent Solution Statement was submitted in 2016.
3. Former Robie Property (3-23493) - CLOSED 01/04/2010	
2005	A Phase I was completed in 2005.
2006	No change in status for 2006.
2007	No change in status for 2007.
2008	A Phase II was submitted to MassDEP on October 21, 2008.
2009	An Activity and Use Limitation (AUL) was recorded with the Suffolk County Registry of Deeds for the site on December 16, 2009.

Table J-30 Massport Contingency Plan (MCP) Closed Sites at Logan Airport (Continued)

Location (RTN) and MassDEP Reporting Status	Action/Status
3. Former Robie Property (3-23493) - CLOSED 01/04/2010 (Continued)	
2010	A Class A-3 RAO was submitted on January 4, 2010, corresponding with the recording of an AUL. On May 21, 2010, a RAM Plan for the Economy Parking Structure was submitted. The first RAM Status Report was submitted on September 21, 2010. An AUL Amendment was recorded on December 9, 2010.
2011	A RAM Completion Statement was submitted on March 15, 2011. Regulatory closure has been achieved. No further response actions are required.
4. Tomahawk Drive (3-27068) - CLOSED 08/20/2008	
2007	Release notification form submitted in August 2007.
2008	A Class B-1 RAO was submitted to MassDEP on January 9, 2009. No further response actions were required.
2009	No further response actions were required.
2011	No further response actions required.
5. Southwest Service Area Overflow Lot/Tomahawk Drive (3-28792) – CLOSED 10/18/2018	
2009	Release notification form was submitted to MassDEP/BWSC on October 8, 2009.
2010	A Class B-1 RAO was submitted to MassDEP on October 18, 2010. No further response actions required.
2011	No further response actions required.
6. Taxiway D (3-29716) – CLOSED 12/21/2011	
2010	Release notification form was submitted on December 22, 2010.
2011	A Class A-1 RAO was submitted on December 23, 2011. No further response actions required.
7. West Outfall Release (3-29792) – CLOSED 02/07/2012	
2011	Release notification form was submitted on April 8, 2011. Two IRA Status Reports were submitted to MassDEP on June 9 and December 5, 2011. A RAO was submitted on February 13, 2012. No further response actions required.
8. Hertz Parking Lot Site (3-30260) – CLOSED 09/05/2012	
2011	Release notification form was submitted on August 29, 2011. A RAM Plan was submitted to MassDEP on September 1, 2011.
2012	A Class A-2 RAO was submitted on September 10, 2012. No Further response actions required.
9. Former Butler Aviation Hangar (3-30654) – CLOSED 11/12/2014	
2012	Verbal notification of a release was provided to MassDEP on February 14, 2012, when Rental Car Center construction encountered an unidentified underground storage, and a Release Notification Form was submitted on April 23, 2012. An IRA Plan was submitted May 21, 2012 and IRA Status Reports were submitted on June 18 and December 26, 2012.
2013	Phase I Report and Tier Classification submitted February 21, 2013 and IRA Completion Report submitted on July 11, 2013.
2014	A Permanent Solution Statement was submitted in October 2014. No further response actions required.
10. Southwest Service Area/Porter Street @ Harborside Drive (3-32022) – CLOSED 11/20/2017	
2014	MassDEP notified of 72-hour Reportable Condition on March 10, 2014
2015	Phase I Report and Tier Classification submitted March 9, 2015.
2016	Permanent Solution Statement scheduled to be submitted in 2017
2017	A Permanent Solution Statement and AUL were submitted November 2017.
11. Former Hangar Building 16 (3-32351) – CLOSED 01/21/2016	
2014	Release Notification Form Submitted August 4, 2014.
2015	A RAM Plan was submitted on January 29, 2015; a Phase I Report and Tier Classification were submitted on August 3, 2015; a RAM Completion Report was submitted November 16, 2015; and a Permanent Solution Statement was submitted on January 21, 2016. No further response actions are required.

Source: Massport

Notes: RTN = Release Tracking Number. This list includes Massport MCP sites only. Additional sites are the responsibility of Logan Airport tenants. Refer to Figure 8-2 in Chapter 8, *Environmental Compliance and Management/Water Quality,* for location of active MCP sites.

AUL Activity and Use Limitation
FDS Fuel Distribution System
IRA Immediate Response Action
MCP Massachusetts Contingency Plan
Phase I Initial Site Investigation
Phase II Comprehensive Site Assessment
Phase III Identification, Evaluation, and Selection of Comprehensive Remedial Actions
Phase IV Implementation of Selected Remediation Action
Phase V Operation, Maintenance and/or Monitoring
RAM Release Abatement Measure
RAO Response Action Outcome

FIGURE J-1 **Massachusetts Contingency Plan Sites (Closed)**

2018/2019 Environmental Data Report

1. North Outfall (3-4837)
2. Former Robie Park (3-10027)
3. Former Robie Property (3-23493)
4. Tomahawk Drive (3-27068)
5. Southwest Service Area Overflow Lot/ Tomahawk Drive (3-28792)
6. Taxiway D (3-29716)
7. West Outfall Release (3-29792)
8. Hertz Parking Lot Site (3-30260)
9. Former Butler Aviation Hangar (3-30654)
10. Southwest Service Area/Porter Street @ Harborside Drive (3-32022)
11. Former Hangar Building 16 (3-32351)

0 450 900 1800 Feet

February is sustainable transportation month as part of Sustainable Massport. Massport is dedicated to providing Massport staff multiple ways to get to work without having to drive their own vehicle. Every car that isn't coming to Logan or other Massport facilities, reduces stress on existing roadways and reduces greenhouse gas emissions.

How to Put the Brakes on Driving Alone to Work

Transit and Vanpool Discounts

- All full, part-time, and job share employees are eligible for 50% reduction off the cost of their public transportation commuting costs, up to $100 per month.
- Employees can take advantage of this program either through reimbursement or on a pretax basis from your paycheck.
- Eligible mass transportation options include MBTA transit, Logan Express buses, Inner Harbor Ferry, Commuter Boat, vanpool and privately operated scheduled buses. For more information, please contact Emily Navarro at x3937, except regarding Vanpools. Matt Carrai of Rideshare by Enterprise can be contacted at Matthew.d.carrai@ehi.com or 508-259-8959 for information on establishing a vanpool.

Massport Shuttles

- Shuttles circulate the airport, making it easy to connect to the Blue Line (Airport Station), the Silver Line, Logan Express, privately operated scheduled buses, and water transportation
- Shuttles run during the work week between the LOC, Terminal C and the Blue Line every 15 minutes from 7:30 - 9:30 AM and 2:00 - 6:00 PM.

Logan Express

- Employee discounts on fares and parking are available at all Logan Express locations, including Framingham, Braintree, Woburn, and Peabody. Discounts are also available on the Back Bay Logan Express.
- For tickets, please contact Emily Navarro at x3937.

Water transportation

- Massport employees can ride the water taxi free of charge Monday – Friday from 7:15 – 9:15 AM and 3:30 – 5:30 PM with a Massport badge all-year round.
- Pre-paid vouchers are also available for work-related travel during other hours. For more information, contact Jamila Richardson at x1756.
- Valid for transportation between the following docks: Logan, Long Wharf, Central Wharf, Rowes Wharf, Moakley Court House, and World Trade Center.

Biking or Walking

- Massport offers bike racks around Logan airport and at other facilities for convenient bike parking.
- Shower facilities are available at the LOC (for badged employees) and may be available at other facilities (check with your supervisor for access and availability).

The Recycling Corner

Test Your Recycling Knowledge! Take our short quiz and find out if you are an expert on the dos and don'ts of recycling at Massport. All of your responses will be anonymous.

TAKE THE QUIZ

Massport's Sustainability Mission:

"Massport will maintain its role as an innovative industry leader through continuous improvement in operational efficiency, facility design and construction, and environmental stewardship while engaging passengers, employees, and the community in a sustainable manner."

Massport's Sustainability Mission
Massport will maintain its role as an innovative industry leader through continuous improvement in operational efficiency, facility design and construction, and environmental stewardship while engaging passengers, employees, and the community in a sustainable manner.

SUSTAINABLE MASSPORT MONTHLY NEWSLETTER

March 2018: Water Resources and Conservation

March is Water Resources and Conservation month as part of *Sustainable Massport*! Massport has taken significant steps to track and reduce water at our facilities. At Hanscom Field, a tenant project by Boston MedFlight built a new hangar reusing on-site groundwater to minimize dust created during construction.

Water Reuse Project at Hanscom Field

Conserve Water at Home
There are easy steps you can do at home to reduce your own water use.

- Turn off the tap while brushing your teeth or shaving: save 4-10 gallons a day.
- Never use your toilet as a wastebasket: save 1.5-4 gallons per flush.
- Don't take marathon showers: five minutes will get you clean. Save 3-7 gallons per shower.
- Close your tub drain before turning on the water: save 3 gallons or more.
- Fill your bathtub only halfway: save 5 gallons or more. You will save hot water costs, too.
- Faucets typically use 2 to 5 gallons per minute. Installing a low-flow faucet aerator can reduce the flow by as much as 25% or up to a gallon and a half per minute.

The Massachusetts Water Resource Authority (MWRA) provides information about water conservation at www.MWRA.com, and will also provide a water saving kit if you live in a MWRA customer community.

In 1986, MWRA customers used a total of 330 million gallons of water per day. Thanks to daily water conservation efforts, demand has been reduced to 195 million gallons per day in 2017. Saving water keeps supplies level and has helped the region control water, sewer and energy costs.

THE RECYCLING CORNER

COMMON CONTAMINANT » FOOD WASTE

Please do not put food waste into Massport's single-stream recycling bins.

Empty and rinse food containers before recycling.

Massport's Sustainability Mission
Massport will maintain its role as an innovative industry leader through continuous improvement in operational efficiency, facility design and construction, and environmental stewardship while engaging passengers, employees, and the community in a sustainable manner.

SUSTAINABLE MASSPORT MONTHLY NEWSLETTER

April 2018: Health and Wellness

April is Health and Wellness month as part of *Sustainable Massport*! In its commitment to enhancing the health and well-being of its employees, Massport is currently offering the following programs:

Employee Health and Wellness

- **HR Open House** will be held on Wednesday, April 11 from 11-2 @ LOC. Open Enrollment will run April 4-May 2 with an effective date of July 1st.
- **Health & Wellness related classes** are available in April and throughout the year as a part of the Health & Wellness Incentive Program including:
  - April 4 - Post-Overdose Response
  - April 11 - Diabetes Awareness
  - April 24 – Work Addiction
- The Human Resources Department would like to remind employees about the partnership we have with Blue Cross Blue Shield of Massachusetts (BCBS) that brings **all** of our employees (including those who do not have health coverage through BCBS) a health & wellness online offering via BCBS's **wellness website** www.ahealthyme.com/login. If you need assistance with creating an account, please contact Tonya Walker at extension 7436.
  - *A few of the website highlights include:*
    - A health assessment that looks at eight different areas of your health and provides you with a personalized wellness score
    - Self-paced on-line workshops on a wide range of topics
    - Tools to help you stay on a healthy track, including nutrition and exercise logs, a recipe library, and a meal planner

Community Events

- **East Boston Little League Opening Day** will be held on April 28th at Massport's Festa Field.

THE RECYCLING CORNER

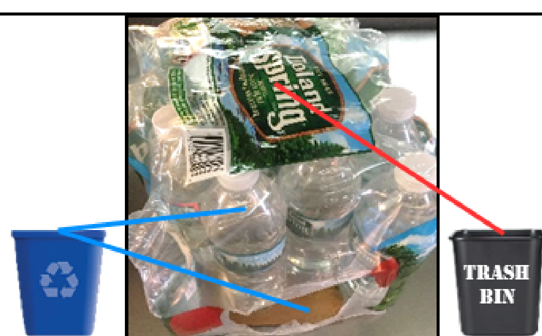
RECYCLE THIS, NOT THAT

A Case of Bottled Water in Plastic Wrap Packaging

massport Recycles

RECYCLE
Plastic Bottles
(no liquids)
Cardboard
(clean, flattened)

Questions? Contact Lauren Laskey
(LLaskey@massport.com, 617-568-3542)



TRASH
Plastic Wrap Packaging
The stretchy plastic wrap packaging that surrounds the outside of a multi-pack of bottles CANNOT be placed into Massport's single-stream recycling containers.

Many stores offer special recycling programs for plastic wrap. Find store drop-off locations: http://www.how2recycle.info/sdo

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SUSTAINABLE MASSPORT MONTHLY NEWSLETTER

May 2018: Parks and Open Space

May is Parks and Open Space month, as part of Sustainable Massport. Massport owns and operates over 30 acres of parks that provide open space, playgrounds, and waterfront views to our neighbors. In addition, our parks also provide critical environmental benefits such as tree canopy and carbon absorption that protect human health and physical property.

Massport parks and open space have offer a great benefit to the community and employees including events and activities for the whole family.

East Boston Parks

- Take a lunch time walk to Piers Park, Navy Fuel Pier, Neptune Road Buffer, Maverick Mothers Pocket Park, and the East Boston Greenway
- The Sailing Center located at Piers Park had its opening day on April 28, and local residents enjoyed sailboat rides and learned about the summer programs at the center
- Starting in July, Zumix, a local non-profit, will be holding free concerts at Piers Park every Sunday at 6pm through the end of August
- The water fountain at Bremen Park will start on the first day of summer vacation for Boston public schools
- Bremen Park has a community gardens section where residents grow flowers, fruit and vegetables all summer long

Piers Park in Bloom

South Boston Parks

- Food trucks operate at South Boston Maritime Park five days a week, Monday – Friday. The trucks are stationed on Northern Avenue from 11:00AM-3:00PM. In addition to the trucks, corn hole boards and Adirondack chairs are in the park for all to enjoy.

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SUSTAINABLE MASSPORT MONTHLY NEWSLETTER

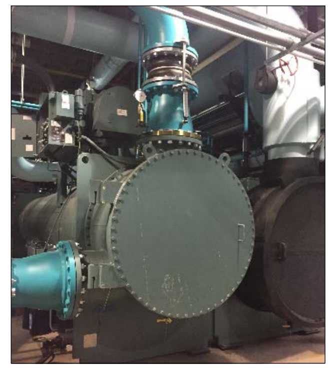
June 2018: Air Quality and Greenhouse Gas Reduction

June is Air Quality and Greenhouse Gas Reduction month, as part of Sustainable Massport. As Massport upgrades our buildings and operations, we are making great strides to invest in air quality and greenhouse gas reduction improvement technologies. These critical improvements will benefit neighboring communities and improve the efficiency of Massport operations.

Examples of air quality improvements and greenhouse gas reductions related projects at Massport include:

Boston Logan International Airport

- 2 new chillers at the Central Heating and Cooling Plant are 30% more efficient than their replacements
    - Last year, new cooling tower extensions were installed at the plant, increase cooling capacity by 15%
- As part of the relocation of the taxi lot to Harborside Drive, Massport is installing four fast charging electrical vehicle charging stations at the new taxi lot.
- 65 new dual charging stations for airline ground service equipment will be installed as part of the Terminal B Optimization project in early 2019.



New Chiller at Central Heating and Cooling Plant

Conley Terminal

- Five rubber tired gantry (RTG) cranes are being upgraded to tier four engines this summer. Air quality improvements from these upgrades will result in a 90% reduction in nitrous oxides and a 13% reduction in particulate matter.

RTG crane engine

THE RECYCLING CORNER

COMMON CONTAMINANTS

STYROFOAM

Please do NOT place **STYROFOAM** into Massport's single stream recycling bins

massport Recycles

Questions?
Contact **Lauren Laskey**
LLaskey@massport.com
617-568-3542

Find out where you can recycle styrofoam:
www.foamfacts.com/recycling/

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SUSTAINABLE MASSPORT MONTHLY NEWSLETTER

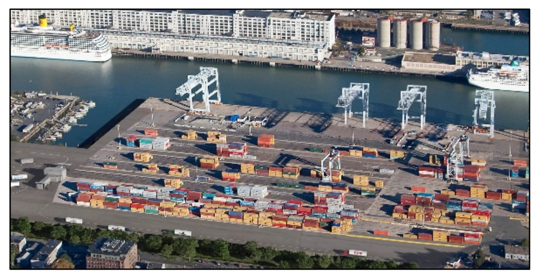
July 2018: Natural Resources

July is Natural Resources month, as part of *Sustainable Massport*. Massport's natural resources, including wetlands, creeks, woods, tidal salt marshes, and mud flats, provide habitat for a wide variety of plants and wildlife. Massport continuously seeks to protect our regions' natural resources while maintaining safe aircraft and vessel operations.

Snowy Owl Trap and Relocation

The Massport Wildlife Management Department partners with a certified airport wildlife biologist to assess and manage all wildlife at Logan Airport. Between November 2017 and July 2018, 94 snowy owls have been trapped and relocated from Logan's airfield through a cooperative relationship between Mass Audubon, the USDA-APHIS Wildlife Services, and Massport. Since the early 1990's, this partnership helped to protect snowy owls, improved our understanding of the species, and promoted aviation safety. Before releasing them back into the wild, researchers attach bands and transmitters to the owls. This allows researchers to learn more about their migratory and behavioral patterns, which had been relatively unknown due to their remote Artic habitat.

Berth 10 at Conley Terminal Soil Remediation



Berth 10 Rendering

The new Berth 10 project at Conley Terminal will restore a former oil terminal to active marine use by removing dilapidated pier structures and constructing a new modern facility. In addition to constructing a pile-supported concrete pier and installing new cranes, this project will remove oil-impacted soil and install a new bulkhead to contain any remaining contamination onsite and prevent oil from seeping into the harbor. Oil-impacted soils will be excavated from the shoreline and dredged from the harbor at Berth 10. In addition to constructing the steel bulkhead, the project will create an additional containment barrier behind the bulkhead using a soil stabilization method.

Always remember to
empty liquids
before recycling

Watch this short video for more recycling tips:
https://app.frame.io/f/42b87705-4407-4e6c-805f-21736b89fb70

Questions? Contact **Lauren Laskey**
(LLaskey@massport.com; 617-568-3542)

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SUSTAINABLE MASSPORT MONTHLY NEWSLETTER

August 2018: Climate Change Adaptation and Resiliency

August is Climate Change Adaptation and Resiliency month as part of *Sustainable Massport.* The Boston region is in the middle of Hurricane Season (June 1 – November 30) and Massport has been implementing various resilience measures to ensure that staff and facilities are protected from potential effects of severe weather. Examples of efforts include enhancing critical infrastructure through permanent and temporary flood-proofing as well as conducting exercises to increase operational preparedness for storms.

The March Nor'easter

In March 2018, a nor'easter heavily impacted the Boston region. In preparation, Massport deployed temporary flood barriers at Maritime properties. This was Massport's first 'real-life' emergency deployment of barriers. Barrier installations were successful and effectively protected assets from surrounding floodwaters.

High Water at the Fish Pier

Test Deployment of Temporary Flood Barriers

The team has been developing strategies to continuously improve the program and address issues encountered during the March nor'easter, such as communication and logistical challenges. Some resilience initiatives include:

- Conducting a test deployment of temporary flood barriers at the MPA Pumping Station (Electrical Telecom Building) at Logan Airport in June. Routine trainings help to increase efficiency and preparedness for deployments.
- Developing a *Massport Flood Resiliency Application* through internal collaboration to improve communication and logistics during deployments.
- Evaluating 'next level' priorities and opportunities for improving flood and disaster resiliency at vulnerable locations

Test Deployment at the Fish Pier

Be Prepared at Home

It is important to be prepared for storms at home too! The *Red Cross Flood and Hurricane Safety Checklists* provide resources and tips that can help to keep your family and home safe. Additional resources are available on the [Massport Resiliency Sharepoint Page].

Massport's Sustainability Mission
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SUSTAINABLE MASSPORT MONTHLY NEWSLETTER

September 2018: Community Partnerships

September is Community Partnerships month as part of *Sustainable Massport*! The support and well-being of the broader community and its schools is an important component of Logan Airport's sustainability goals. Community investment enhances the communities' ability to prosper and invest in their own development. In recognition of all the valuable community work undertaken this summer by dedicated Massport staff, here are highlights of the programs and projects we support.

Massport Backpack Program
Each summer, Massport coordinates a backpack drive for homeless and in-need children between the ages of 4 and 17. This year, Massport sponsored children at the Crossroads Family Center in East Boston, the Joseph M. Tierney Learning Center in South Boston and Heading Home in Charlestown. In August, 65 children received backpacks filled with school supplies and a new outfit for their first day of school- our highest response yet by Massport employees! This program is invaluable in strengthening the children's self-esteem, encourages them to look forward to the new school year, and sends a strong message that others care about them and their education.

Massport Food Drive
Each fall, Massport coordinates a food drive to help those less fortunate. For the upcoming Thanksgiving season, Massport is assisting three organizations: The Crossroads Family Center, The Winthrop Food Pantry and The South Boston Community Health Center (SBCHC) Food Pantry. Collections will begin on Monday, October 8, 2018 and end on Friday, November 9, 2018. An announcement will be made in October with the full details of the Massport Food Drive.

"Love Your Block" Neighborhood Cleanup
Massport proudly supports the City of Boston's "Love Your Block" neighborhood cleanup initiative. Each spring, Massport employees volunteer time to help beautify our neighboring communities by cleaning streets, painting, planting and weeding.

Massport's Sustainability Mission
Massport will maintain its role as an innovative industry leader through continuous improvement in operational efficiency, facility design and construction, and environmental stewardship while engaging passengers, employees, and the community in a sustainable manner.

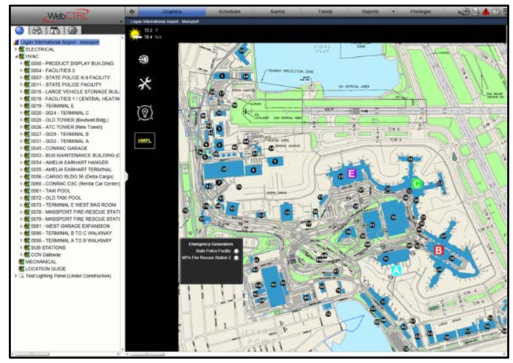
SUSTAINABLE MASSPORT MONTHLY NEWSLETTER

October 2018: Energy Efficiency

October is Energy Efficiency Month as part of *Sustainable Massport*! As Massport builds and upgrades facilities to keep up with passenger growth, we continue to invest in sustainable and energy reduction systems.

Master Building Control

Massport is expanding the ability to monitor and control all Logan Airport building operations remotely through a Master Building Control System (MBCS). This ensures peak operational performance of all HVAC and lighting systems, while expanding the opportunity to reduce energy consumption. Massport is converting and integrating our older building control systems onto the MBCS and new building systems are installed on the MBCS. As the MBCS encompasses more operations, staff are being trained to monitor the system remotely to more easily ensure peak performance for lighting and HVAC systems. The MBCS will also provide the opportunity for Massport to retro-commission the HVAC and lighting systems to reduce energy use.



Online Portal for Master Building Control System

Lighting Retrofits

- Conley Container Terminal recently retrofitted their high mast yard lighting with LEDs, cutting their energy use by half and resulting in over 175,000 kWh of energy savings.
- Since 2016, Massport has retrofitted over 6,200 lighting fixtures with energy efficient LEDs at Boston Logan Airport. The retrofits included lighting in the terminals, parking garages, streetlights, and airport facilities as part of a program designed to reduce energy use and improve lighting performance. The result is annual savings of 2,600 MWh of annual savings and a reduction of 890 metric tons of greenhouse gas (GHG) emissions!

Retrofitting streetlights with LEDs

THE RECYCLING CORNER

THANK YOU FOR RECYCLING THESE ITEMS

Scan the QR Code to learn more about the new statewide list of recyclable & non-recyclable items!

Metal

Food and Beverage Cans
empty and rinse

Plastic

Bottles, Jars, Jugs and Tubs
empty and replace cap

Glass

Bottles and Jars
empty and rinse

Paper & Cardboard

Mixed Paper, Newspaper, Magazines, Boxes
empty and flatten

Questions? Contact **Lauren Laskey** (LLaskey@massport.com; 617-568-3542)

massport Recycles

Massport will maintain its role as an innovative industry leader through continuous improvement in operational efficiency, facility design and construction, and environmental stewardship while engaging passengers, employees, and the community in a sustainable manner.

SUSTAINABLE MASSPORT MONTHLY NEWSLETTER

November 2018: Waste Management and Recycling

November is Waste Management and Recycling Month as part of *Sustainable Massport*! Massport has been developing solutions to encourage waste reduction, reduce the level of contamination in the recycling stream, and increase the amount of materials properly recycled, despite industry-wide challenges.

Logan Airport Waste Assessment

Massport is conducting a comprehensive waste assessment of Logan Airport to augment our understanding of the waste streams, identify challenges, and develop recommendations for improving the waste management and recycling program. A robust plan is being developed, which will identify multi-pronged strategies to successfully implement recommended initiatives and promote continuous improvement of the waste management and diversion system.

Team conducts waste audit

Prevent Contamination and Recycle Right

Contamination occurs when improper items are placed into recycling containers. A small amount of contamination can cause all of the materials within a container to be diverted as trash to landfills--- even if there are 'good' recyclable items mixed in there! Therefore, it is important to learn what you can and cannot put into single-stream recycling.

If you are unsure if an item is recyclable, please throw it in the trash.

Please DO place these items in your blue bins!

Food and Beverage Cans
empty and rinse

Bottles, Jars, Jugs and Tubs
empty and replace cap

Bottles and Jars
empty and rinse

Mixed Paper, Newspaper, Magazines, Boxes
empty and flatten

Please do NOT place these common contaminants in your blue bins!

FOOD / LIQUID

PLASTIC BAGS

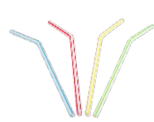
PLASTIC WRAP/FILM

FOOD/CANDY WRAPPERS

STYROFOAM

PAPER CUPS

STRAWS



PLASTIC UTENSILS

Questions? Contact Lauren Laskey (llaskey@massport.com; 617-568-3542)

ission

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SUSTAINABLE MASSPORT MONTHLY NEWSLETTER
December 2018: Sustainable Tenants

December is Tenant Month as part of *Sustainable Massport*! Massport is proud to support our tenants' sustainable business initiatives. Examples of sustainable tenants at Logan Airport include but are not limited to: Legal Sea Foods and the Hilton Hotel.

Legal Sea Foods

To help protect the environment, Legal Sea Foods has adopted a variety of sustainable practices at Logan Airport. In May 2018, Legal Sea Foods eliminated the use of Styrofoam boxes for seafood deliveries to their six restaurants at the Airport. This initiative has significant environmental benefits by preventing roughly 20,000 non-recyclable Styrofoam boxes from entering landfill each year. In addition, their new cardboard box delivery method will contribute to improving the recycling rate at the Airport. In an effort to reduce the use of single-use plastics, the restaurants began offering paper, compostable straws in July 2018.

Hilton Hotel

The Hilton Hotel at Logan Airport has implemented a variety of sustainability initiatives to reduce environmental impacts. In March 2018, the hotel initiated a large-scale composting program for food waste collected in kitchens. Within the first six months, the program helped to divert more than 95,000 lbs. of organic materials from landfill. This equals 47.5 tons or almost 10 elephants! Compost created through this program is used to enrich soil and grow fresh vegetable gardens at roughly 50 schools and colleges in the region.

In addition to these efforts, Hilton aims to minimize the use of disposable plastic materials by providing guests with compostable alternatives for straws, cups, and more.

THE RECYCLING CORNER — COMMON CONTAMINANTS

Paper cups
DO NOT BELONG
in mixed recycling containers!

There is a wax or plastic lining on these items that is extremely difficult to separate during the recycling process.

Massport Recycles

Questions? Contact **Lauren Laskey**
(LLaskey@massport.com; 617-568-3542)

Learn more at recyclesmartma.org

For more resources, visit the Massport Recycling Sharepoint Page: http://sharepoint/CapitalPrograms/Sustainability/SitePages/Recycling.aspx

Sustainability Highlights

August 2019

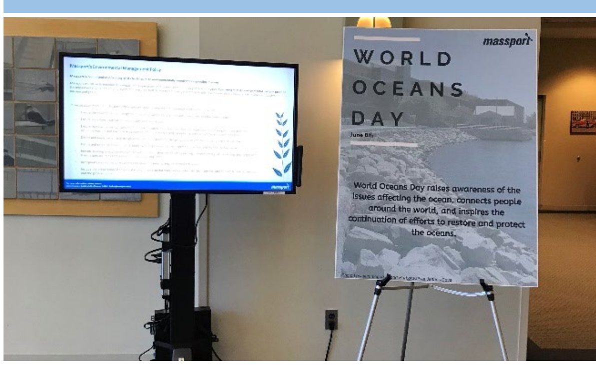
Inspired by feedback from the 2019 Sustainable Massport 2.0 charrettes, this newsletter highlights some of Massport's recent sustainability accomplishments and ongoing initiatives.

Environmental Engagement

Hazardous Waste Collection Event
In honor of Earth Day (April 22), this event provided Massport employees and Logan tenants with the opportunity to recycle and safely dispose of household hazardous waste for free. Over 100 people participated and more than 8,800 pounds of waste was collected (e.g., electronics, batteries, oil).

Harborwalk Clean-Up
Massport conducted a week-long cleanup of the Logan Harborwalk at Jeffries Cove in April to help protect Boston Harbor's important natural resources and wildlife. The team collected roughly 1 ton of debris that had washed up along the shore.

Love Your Block
Demonstrating commitment to community and the environment, many Massport employees participated in Love Your Block Community Cleanups in May, helping to cleanup and beautify neighborhoods in South Boston and East Boston.



Environmental Awareness
To celebrate *World Environment Day* (June 5) and *World Oceans Day* (June 8), educational slideshows were displayed as an opportunity for employees to learn more about each awareness day, Massport's supporting initiatives, and how to help make a difference. Slideshows are available on the Sustainability Sharepoint page.

To suggest ideas for future environmental engagement opportunities, please reach out to:
Peter DeBruin (PDeBruin@massport.com, 617-568-3583) or Lauren Laskey (llaskey@massport.com, 617-568-3542)

Project Highlights

- Massport successfully passed the *ISO 14001 for Environmental Management System (EMS)* audits for Hanscom Field (April) and Logan (May). The EMS aims to minimize the impact of operations on the environment through the continuous improvement of environmental performance and the implementation of mitigation and pollution prevention measures. The EMS process for Maritime will begin this fall.

- To foster a sustainable culture in the workplace, the Sustainability Meeting Guidelines and Checklist have been revised to encourage sustainable practices in the workplace. These documents are available on the Sustainability Sharepoint page.

- In March, Massport achieved LEED Gold certification for the Terminal B–Gates 37/38 Connector. This project reduced lighting power consumption by 52%, potable water usage by 28%, and diverted 72% of construction waste from landfill. Additionally, 23% of building materials were manufactured from recycled content, 100% of wood products were sustainably sourced (FSC certified), and 34% of the materials used in the project were manufactured regionally within 500 miles of the site. Massport is pursuing LEED certifications for several projects as well as evaluating other green building certifications to further enhance performance.

- To reduce emissions, electric ground support equipment (eGSE) charging infrastructure is being installed at Logan. There are more than 115 eGSE at the Airport. American Airlines has committed to buying another 99 eGSE by 2022; JetBlue will acquire 94 eGSE by 2023. Landside charging stations for electric vehicles (EVs) are also being installed across the Authority. There are 77 EV charging ports at Logan, and 56 more are planned for installation by 2020. Massport is seeking funding for additional airside and landside charging stations. Massport also recently replaced 12 pool vehicles with EVs and aims to continue expanding the electric fleet.

- Massport has been continuously enhancing resiliency efforts. The Flood Operations Plans for Logan and Maritime were updated to reflect recent lessons learned and evolving preparedness strategy. Logan flood barrier crates were also relocated from storage in S. Boston to Logan to reduce operational response time and increase preparedness. In addition, the design is now complete and construction will begin on enhancing existing flood resiliency at the Fish Pier while reducing operational impact of barrier deployments. Massport also recently initiated a program definition study to evaluate flood resiliency for the next tier of critical assets at Massport's coastal assets.

Next Steps

- The Sustainable Massport 2.0 Report is being finalized.
- The Sustainable and Resiliency Design Guidelines are being revised to make it more user friendly, incorporating the latest best practices, incorporating project tracking mechanisms such as an interactive project checklist and initiation form. Sustainable guidelines for tenant construction are also being developed.
- Massport is in the process of expanding the liquid collection program in Logan terminals to improve the diversion and waste management system.
- The 2019 Annual Sustainability and Resiliency Report will be released this fall
- A tabletop exercise modeling a Category 3 hurricane impact at Logan and Maritime facilities is being planned.

VOL 43, ISSUE 4, OCTOBER 2019

SUSTAINABLE MASSPORT NEWSLETTER

This quarterly newsletter aims to enhance communication and visibility of Massport's recent sustainability accomplishments, and ongoing initiatives as well as to provide educational resources.

The Logan Office Center has 20 micro-wind turbines on the roof to help power the building with renewable energy

Mark Your Calendar

October:

Energy Awareness Month

November:

Nov. 15: America Recycles Day

Nov. 21: World Fisheries Day

Sustainability Tip

***In honor of Energy Awareness Month*, learn more about energy efficiency programs, incentives, and products that could help you save energy and money in your home at:** www.mass.gov/energy-efficiency-for-your-home

Continued Commitment:

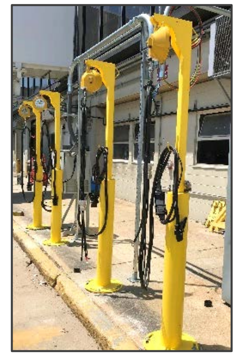
Demonstrating ongoing commitment to protecting the environment, Massport successfully passed the *ISO 14001 for Environmental Management System (EMS)* audits for Hanscom Field (April) and Logan Airport (May). This represents a significant achievement in environmental management and performance!

The EMS aims to minimize the impact of operations on the environment through the continuous improvement of environmental performance and the implementation of mitigation and pollution prevention measures. This includes but is not limited to investing in and monitoring strategies to conserve energy, improve efficiency of lighting and heating systems, protect water resources, enhance recycling, and more.

In 2001, Hanscom Field became the first U.S. airport to attain ISO 14001 certification. Logan Airport facilities first became certified in 2006. While Conley Terminal achieved its initial EMS certification in 2003, the EMS has been expanded to all Marine Operations with the addition of Flynn Cruiseport and Fish Pier in 2017.

The annual process of maintaining the EMS certification for Marine Operations is currently underway and will continue through December.

Massport Receives $3.1 Million VALE Grant for Electrification Initiative!



Massport is investing in a number of initiatives to reduce emissions. This includes a comprehensive, Logan-wide initiative by Massport and airlines to install electric charging infrastructure as airlines replace their ground services equipment (GSE) with electric powered versions. **Logan Airport recently received a $3,051,925 grant from the FAA's Voluntary Airport Low Emissions (VALE) Program to support the airside electrification initiative.** The grant will fund infrastructure for about 43 charging stations at Terminal C, the Airport's busiest terminal. Massport will match the grant by covering about 25% of the cost.

Massport is installing charging stations at all of the terminals as airlines work to replace appropriate vehicles by 2028 with commercially available electric substitutes. This latest investment builds on the existing 23 electric chargers at Terminal A, 5 in place and 55 under construction at Terminal B, and 2 in place at Terminal E. All terminals will have charging stations installed over the next few years. There are currently more than 115 eGSE at the Airport. Many airlines have made laudable commitments to electrify their fleets. It is estimated that conversion to electric equipment will **reduce emissions by nearly 178,000 tons of carbon dioxide** over the lifetime of the equipment!

Landside charging stations for electric vehicles (EVs) are also being installed across the Authority. There are 77 EV charging ports at Logan, and 56 more are planned for installation by 2020. Massport is seeking funding for additional airside and landside charging stations.

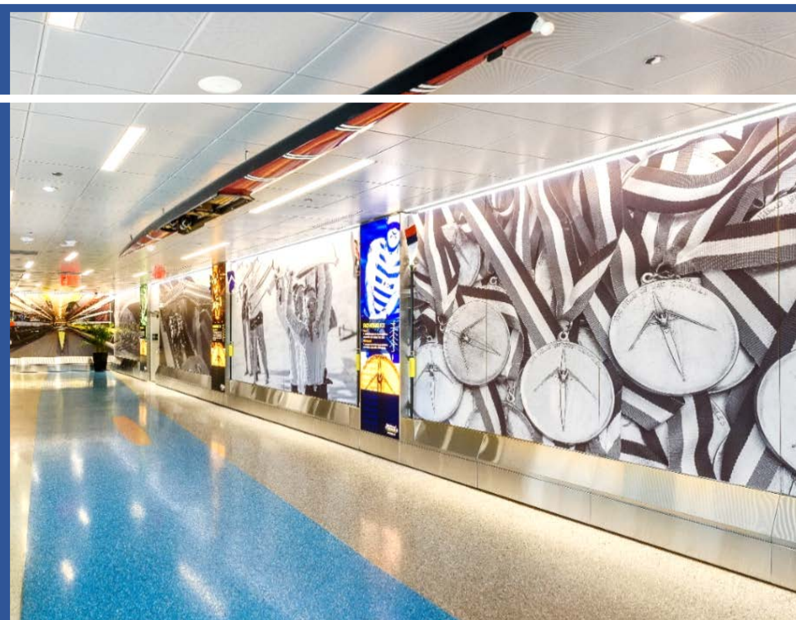
Massport also recently replaced 12 pool vehicles at the Logan Office Center with electric alternatives, which will help to reduce emissions associated with Massport's fleet operations. Massport strives to continue expanding the fleet with environmentally responsible, electric vehicles.

GOING FOR THE GOLD

In March 2019, Massport achieved Leadership in Energy and Environmental Design (LEED) Gold certification for the Logan Airport Terminal B– Gates 37/38 Connector project.

Among other benefits, this project reduced lighting energy consumption by 52%, potable water usage by 28%, and diverted 72% of construction waste from landfill.

Massport is in the process of evaluating additional green building certifications to further enhance performance



Love Your Block

Demonstrating commitment to the community and the environment, many Massport employees participated in the Love Your Block Community Cleanups in May, helping to cleanup and beautify neighborhoods in South Boston and East Boston.

Harborwalk Clean-Up

Massport conducted a week-long cleanup of the Logan Harborwalk at Jeffries Cove in April to help protect Boston Harbor's important natural resources and wildlife. The team collected roughly 1 ton of maritime debris that had washed up along the shore.

Hazardous Waste Collection Event

In honor of Earth Day (April 22), this event provided Massport employees and Logan tenants with the opportunity to recycle and safely dispose of household hazardous waste for free. Over 100 people participated and more than 8,800 pounds of waste was collected (e.g., electronics, batteries, oil).

Help to conserve energy by turning off lights when you are not in your office and if you are the last to leave a conference room! *To learn more about methods for conducting sustainable meetings and being more eco-friendly in the workplace, read the latest edition of Massport's Sustainable Meeting Guidelines, which are available on the Sustainability Sharepoint page or by reaching out to sustainability@massport.com*

Resilient Massport

Massport continues to enhance climate resiliency through efforts such as:

- The Flood Operations Plans for Logan and Maritime were updated to reflect recent lessons learned and evolving preparedness strategy.
- Logan flood barrier crates were relocated from storage in S. Boston to Logan to reduce operational response time and increase preparedness.
- The design is now complete and construction will begin on enhancing existing flood resiliency at the Fish Pier while reducing operational impact of barrier deployments.
- Massport recently initiated a program definition study to evaluate flood resiliency for the next tier of critical assets at Massport's coastal assets.

The Recycling Corner

Common Contaminants

Food & Drink Cartons

Cartons CANNOT be recycled in mixed recycling containers!

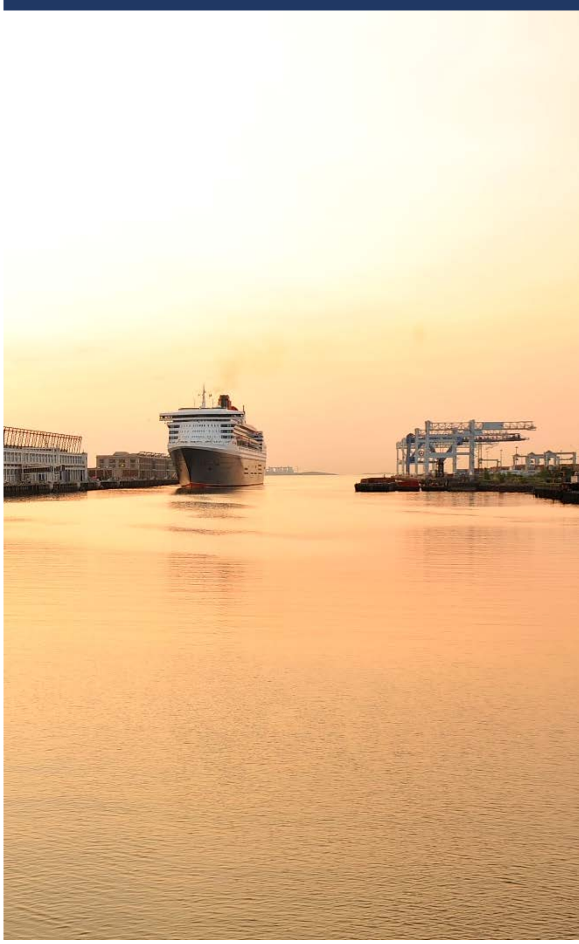
Examples: juice, soup, and milk cartons

There is a wax or plastic lining on these items that is extremely difficult to separate during the recycling process.

Please place these items into the **TRASH**

Additional recycling resources are available on the MADEP Recycle Smart website: https://recyclesmartma.org

On The Horizon…



- Massport is finalizing the Sustainable Massport 2.0 Report, highlighting the environmental vision of over 130 stakeholders.
- The Sustainable and Resiliency Design Guidelines are being revised to make it more user friendly, incorporating the latest best practices, and project tracking mechanisms such as an interactive project checklist and initiation form. Sustainable guidelines for tenant construction are also under development.
- Massport is in the process of expanding the liquid collection program in Logan terminals to improve the diversion and waste management system.
- The 2019 Annual Sustainability and Resiliency Report will be released this Fall.
- A tabletop exercise modeling a Category 3 hurricane impact at Logan and Maritime facilities is being planned for early 2020.

Please direct any questions, comments, or suggestions for future newsletters to: sustainability@massport.com, or
Peter DeBruin, Climate Mitigation & Resiliency Manager: pdebruin@massport.com, 617-568-3583
Lauren Laskey, Sustainability Planner: llaskey@massport.com, 617-568-3542

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Peak Period Pricing Monitoring Reports

- 2018 Peak Period Pricing Monitoring Report
- 2019 Peak Period Pricing Monitoring Report
- Memorandum from Edward C. Freni, Massport Director of Aviation, to the Boston Airline Committee (BAC), Regarding Boston-Logan International Airport Peak Period Surcharge Regulation Monitoring Report. Dated June 5, 2019
- 2020 Peak Period Pricing Monitoring Report

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BOSTON-LOGAN INTERNATIONAL AIRPORT MONITORING REPORT ON SCHEDULED AND NON-SCHEDULED FLIGHT ACTIVITY

Peak Period Surcharge Regulation 740 CMR 27:00: Massachusetts Port Authority

Report Number:	**015**
Monitoring Period:	**Through Sept. 2018**
Report Issue Date:	**May 2018**

<u>Note</u>: This report reflects the Boston-Logan Airport flight activity monitoring under 740 CMR 27.03 Peak Period Surcharge Regulation on Aircraft Operations at Boston-Logan International Airport.

<u>Findings</u>: This report includes actual and projected activity data **<u>through September 2018</u>**. Current and projected near-term flight levels at Boston Logan are well below Logan's good weather (VFR) throughput of approximately 120 flights per hour. **As a result, average VFR delays are projected to be minimal and well below the 15 minutes threshold through the analysis period.**

In the event demand conditions at the airport change significantly from the current projection, Massport will issue updates to this report.

<u>Attachments</u>

Table 1: Summary Overview of Peak Period Surcharge Program

Table 2: Summary Overview of Forecast Methodology

Table 3: Projected Aircraft Operations at Logan Airport Projected

Table 4: Projected Hourly Operations, Average Weekday

Table 5: Forecast Logan Average Weekday Operations

<u>Massport Contact:</u>

Mr. Flavio Leo
Director, Aviation Planning and Strategy
617-568-3528
fleo@massport.com

Table 1: Summary Overview of Peak Period Surcharge Program

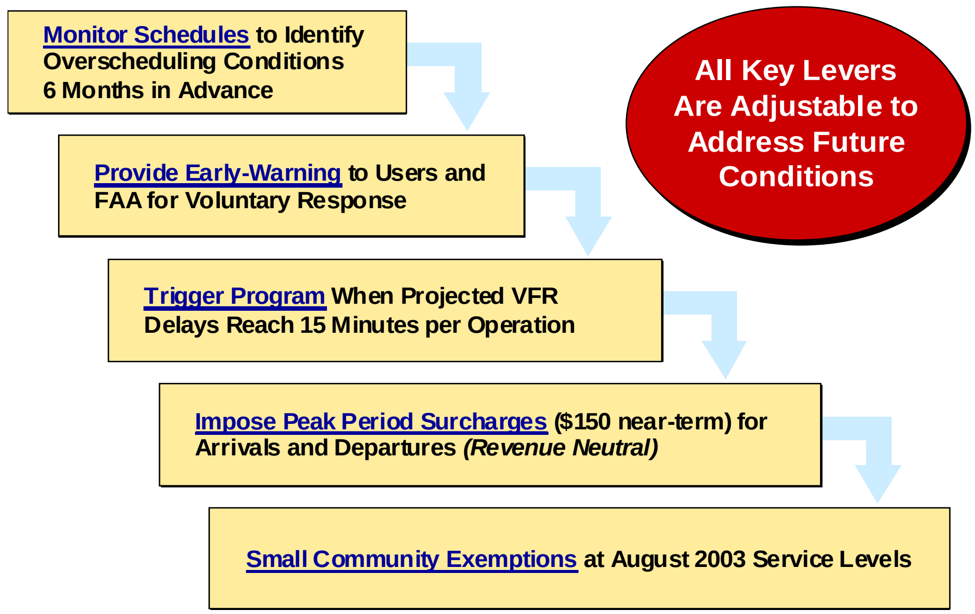

Table 2: Summary Overview of Forecast Methodology

- Scheduled passenger airline flights represent about 93 percent of total aircraft operations. Passenger airline activity for the Spring and Summer periods were projected based on published advance airline schedules
- Forecasts of monthly activity for other segments (GA, Cargo, Charter) are based on the past three months of actual flight volume and historic patterns of monthly seasonality
- Day-of-week and time of day distributions for non-scheduled segments are based on analysis of Logan radar data
- Projections for each segment were combined to produce the forecast pattern of hourly flight activity for an average weekday, Saturday, and Sunday for the period from February through September

Table 3: Aircraft Operations at Logan Airport

Note: Actual Operations are based on Massport data/air carrier reports and reflect flight cancellations due to weather and other operational impacts. Projections, scheduled activity only.

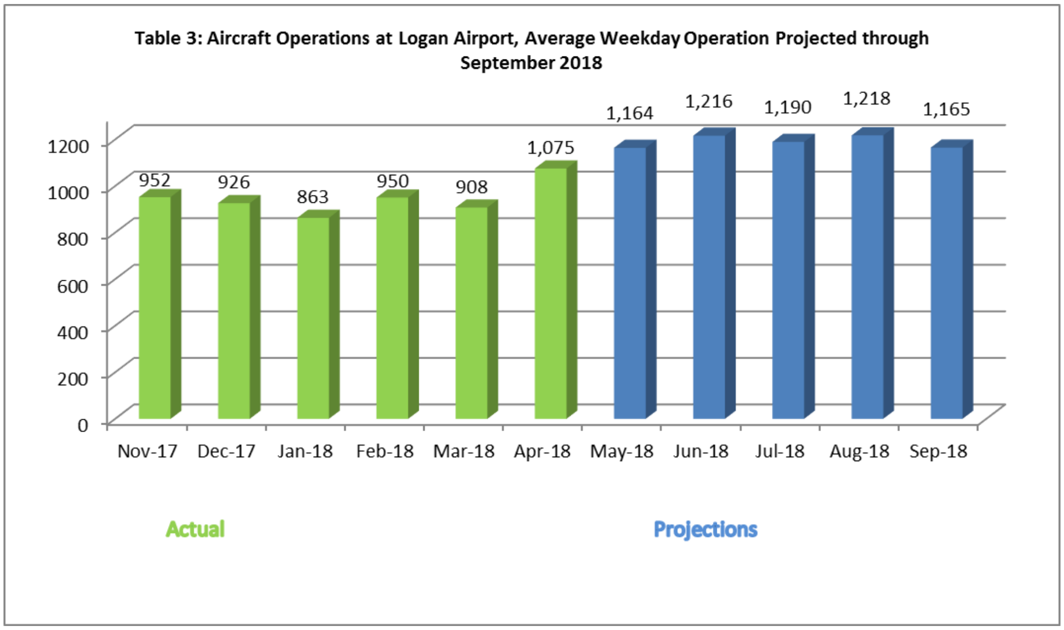

Table 4: Projected Hourly Operations

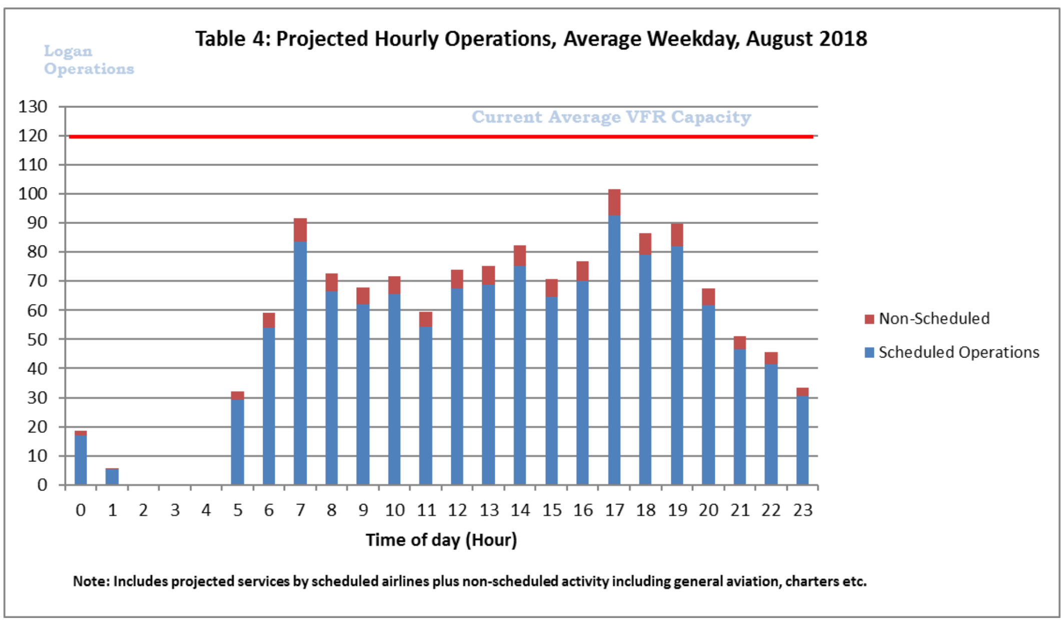

Table 5: Forecast Logan Average Weekday Operations, *Feb. – Sep.*

Forecast Daily Operations								
Hour Range	Feb-18	Mar-18	Apr-18	May-18	Jun-18	Jul-18	Aug-18	Sep-18
0	12	16	20	20	19	16	17	17
1	4	6	8	4	6	6	5	5
2	1	2	2	0	0	0	0	0
3	0	1	1	0	0	0	0	0
4	4	2	3	0	0	0	0	2
5	20	18	24	27	29	30	29	21
6	47	42	51	59	58	52	54	55
7	59	53	65	73	80	82	84	78
8	55	50	61	64	66	66	66	62
9	56	56	63	65	71	63	62	65
10	48	46	56	64	67	63	66	64
11	45	46	50	48	52	54	54	53
12	44	45	49	66	67	66	68	65
13	53	51	60	73	69	65	69	68
14	54	53	58	67	70	72	75	71
15	55	49	56	64	67	64	65	62
16	56	52	56	70	70	69	70	68
17	58	57	64	84	93	90	93	93
18	64	60	67	76	73	73	79	79
19	60	53	66	75	75	79	82	75
20	54	52	62	49	61	61	62	53
21	43	39	51	51	52	46	47	49
22	35	34	48	38	41	42	42	37
23	24	27	35	27	30	29	30	25
Total	950	908	1,075	1,164	1,216	1,190	1,218	1,165

February - April are actual data
May - September is forecast scheduled activity only

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Peak Period Surcharge Regulation
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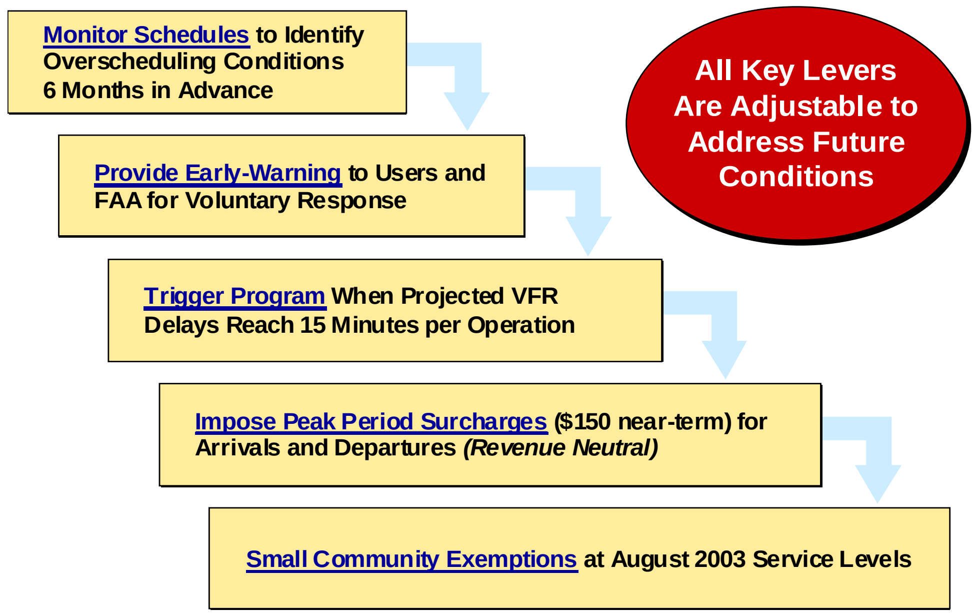

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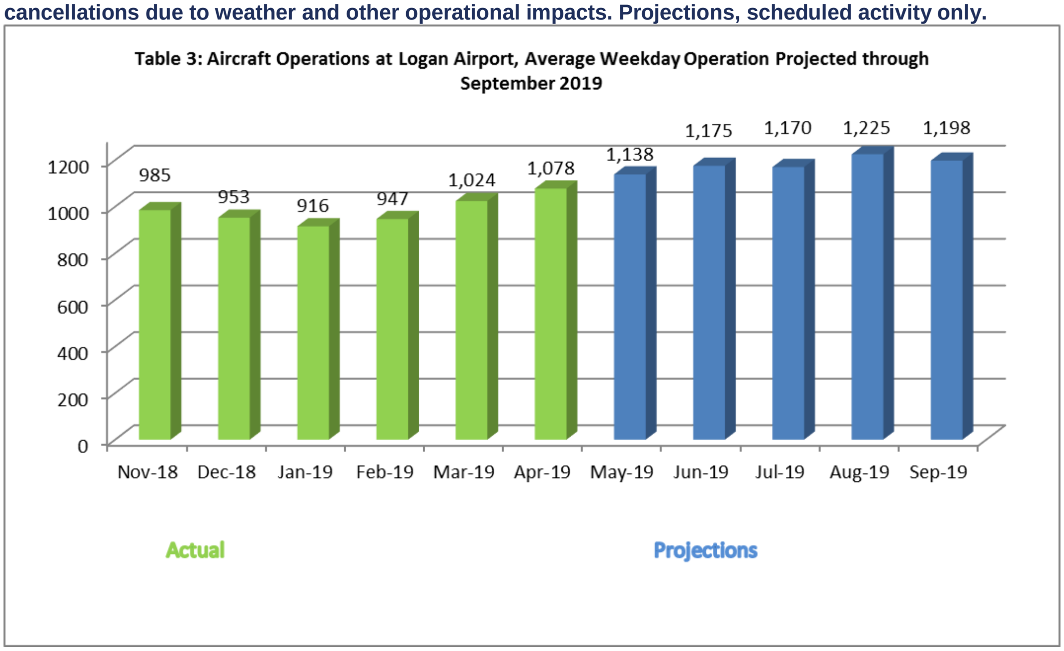

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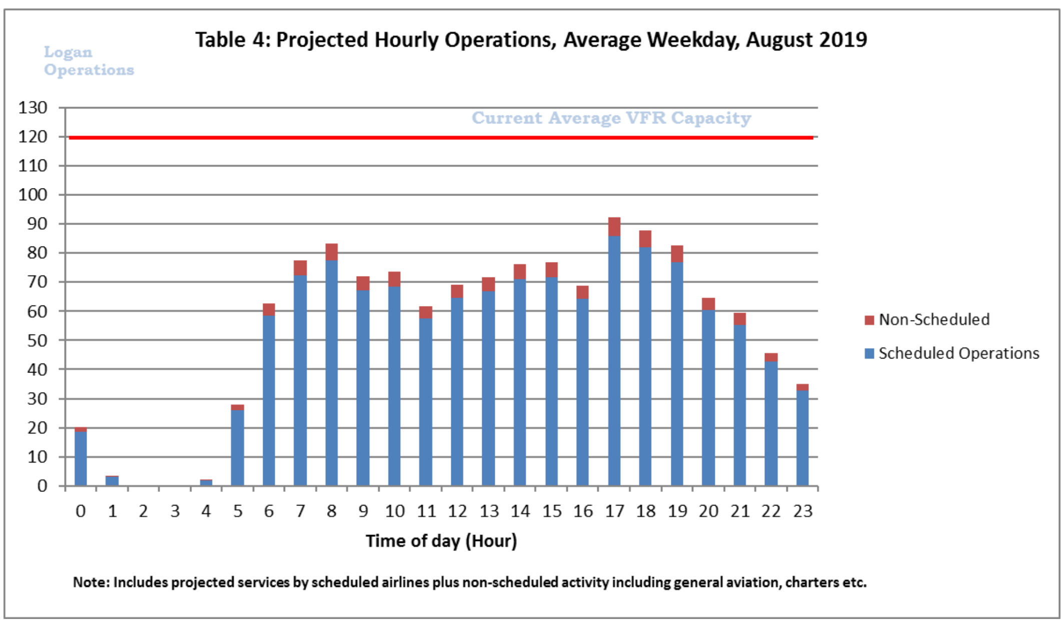

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Forecast Daily Operations								
Hour Range	**Feb-19**	**Mar-19**	**Apr-19**	**May-19**	**Jun-19**	**Jul-19**	**Aug-19**	**Sep-19**
0	14	15	17	16	15	15	19	11
1	6	7	7	5	5	5	3	4
2	2	2	2	0	0	0	0	0
3	2	2	1	0	0	0	0	0
4	4	4	4	4	3	2	2	2
5	19	23	27	25	26	27	26	20
6	44	49	51	50	55	55	59	55
7	56	59	61	71	69	68	72	71
8	50	54	61	68	74	73	78	81
9	53	57	61	68	66	65	67	61
10	50	56	62	64	65	63	69	69
11	49	53	57	50	52	55	58	57
12	47	44	48	59	62	62	65	64
13	49	53	55	58	62	62	67	68
14	54	56	55	74	69	71	71	70
15	54	57	57	66	73	70	72	70
16	58	60	62	52	58	62	64	69
17	57	63	61	87	83	82	86	83
18	59	68	69	81	80	78	82	81
19	57	59	61	65	70	75	77	71
20	48	60	60	49	57	57	60	61
21	46	51	57	55	54	51	55	54
22	45	41	47	42	44	41	43	41
23	26	31	35	30	32	31	33	34
Total	**947**	**1,024**	**1,078**	**1,138**	**1,175**	**1,170**	**1,225**	**1,198**

February - Apr are actual data

May - September is forecast data

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www.massport.com

June 5, 2019

Boston Airline Committee (BAC)
c/o Kevin Costello
Director Infrastructure, Properties & Development
jetBlue Airways Corporation
27-01 Queens Plaza North
Long Island City, New York 11101

Re: Boston-Logan International Airport Peak Period Surcharge Regulation Monitoring Report

Dear Mr. Costello:

The Massachusetts Port Authority (Massport) has completed the Peak Period Pricing Monitoring Report for 2019, in compliance with Massport's Peak Period Surcharge Regulation (740 CMR 27.03) ("Regulation"). The Regulation requires that Massport monitor published scheduled and expected non-scheduled aircraft activity at Logan and report to airfield-users the implication of the total projected aircraft activity on Logan's good weather delays. I have attached a copy of the Monitoring Report.

The Monitoring Report includes historical and projected activity data for the 2019 spring and summer season. The report concludes that current and projected near-term flight levels at Boston-Logan are well below Logan's good weather (VFR) throughput of approximately 120 flights per hour. As a result, average VFR (good weather) delays based on the expected demand are projected to be minimal through the analysis period and well below the 15 minutes threshold of the Peak Period Surcharge Regulation.

Please forward a copy of this Monitoring Report to the BAC membership. If you have any questions please feel free to contact Flavio Leo at 617-568-3528 or Greg Zanni at 617-561-3372.

Sincerely,

Edward C. Freni
Director of Aviation

cc: Todd Smith, Daniel Gallagher, Greg Zanni, Flavio Leo

BOSTON-LOGAN INTERNATIONAL AIRPORT MONITORING REPORT ON SCHEDULED AND NON-SCHEDULED FLIGHT ACTIVITY

Peak Period Surcharge Regulation 740 CMR 27:00: Massachusetts Port Authority

Report Number:	**017**
Monitoring Period:	**June-July 2020**
Report Issue Date:	**June 2020**

Note: This report reflects the Boston-Logan Airport flight activity monitoring under 740 CMR 27.03 Peak Period Surcharge Regulation on Aircraft Operations at Boston-Logan International Airport.

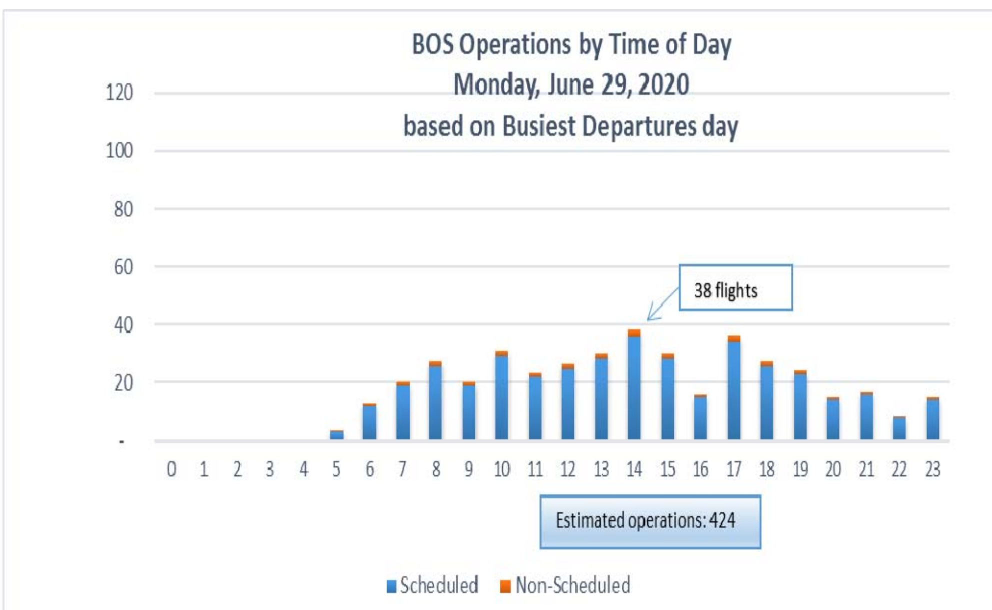
Due to the Corona virus disruption, significant drop in flight operations, and continued uncertainty in flight schedules, this report is limited to reporting on traffic at Logan for June and July 2020. In the event demand conditions change significantly from expected, updates to this report will be issued.

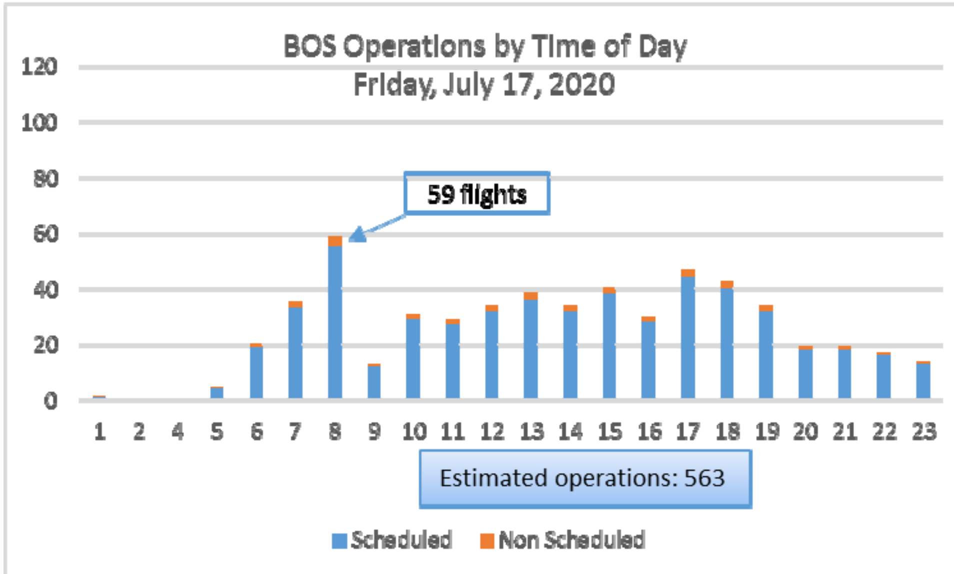
Findings: Current and projected near-term flight levels at Boston Logan are well below Logan's good weather (VFR) throughput of approximately 120 flights per hour. **As a result, average VFR delays are projected to be minimal and well below the 15 minutes threshold through the analysis period.**

Massport Contact:

Mr. Flavio Leo
Director, Aviation Planning and Strategy
617-568-3528
fleo@massport.com

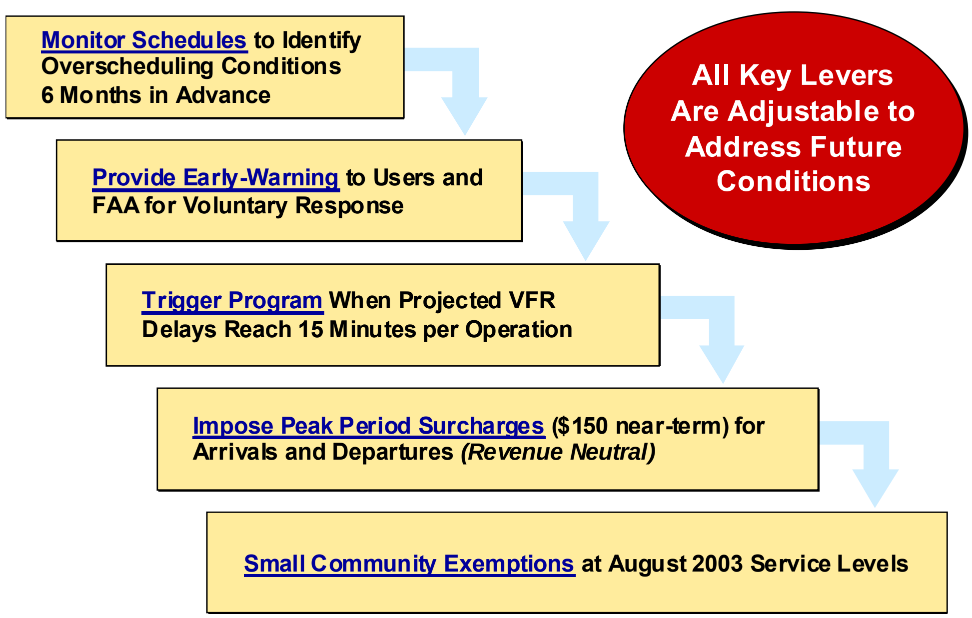
Projected Traffic June and July*





*Note due to the Corona virus disruption, air carrier schedules are subject to change.

Table 1: Summary Overview of Peak Period Surcharge Program



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Reduced/Single Engine Taxiing at Logan Airport Memoranda

This Appendix provides detailed information in support of Chapter 7, *Air Quality/ Emissions Reduction:*

- Memorandum from Edward C. Freni, Massport Director of Aviation, to the Boston Logan Airline Committee, Regarding Single/Reduced-Engine Taxiing and Other Strategies to Reduce Aircraft-Generated Emissions and Noise at Boston Logan. Dated May 22, 2018
- Memorandum from Edward C. Freni, Massport Director of Aviation, to the Boston Logan Airline Committee, Regarding Update on Single/Reduced-Engine Taxiing and Other Strategies to Reduce Aircraft-Generated Emissions and Noise at Boston Logan. Dated June 12, 2019

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massport
Massachusetts Port Authority
One Harborside Drive
East Boston, MA 02128-2909
Telephone (617) 568-5000
www.massport.com

To: Boston Airline Committee

From: Edward C. Freni
Director of Aviation

Date: May 22, 2018

RE: Single/Reduced-Engine Taxiing and Other Strategies to Reduce Aircraft-Generated Emissions and Noise at Boston Logan

As an important user of Boston-Logan International Airport ("Boston Logan"), you are an essential partner in our efforts to ensure that Boston Logan operates in the safest, most dependable and environmentally responsible manner. Although the aviation industry has been highly successful in reducing noise and emissions, there are additional opportunities to further reduce aircraft noise and emissions including: 1. Single/reduced-engine taxiing, 2. Use of idle-reverse thrust, and 3. Retrofitting older A320 aircraft with "vortex generators" to reduce aircraft noise.

We understand that single or reduced-engine taxiing is being voluntarily implemented by the vast majority of air carriers at Boston Logan. I write to you to encourage your continued use of this fuel-saving emissions reduction strategy, subject to pilot discretion and to the extent consistent with your established operating safety procedures.

I also encourage your use of idle reverse thrust (or to minimize the use of reverse thrust) on landing, as a second operational measure, again, only at the discretion of the pilot and consistent with your established operational safety procedures. This measure provides noise relief to our nearest neighbors and, at the same time, provides companion benefits to you, such as reducing fuel burn and engine wear. Clearly, the use of this procedure must be consistent with operational conditions at Boston Logan, including runway surface conditions and whether LAHSO is in use.

Finally, I urge you to continue recent industry efforts to retrofit A320 family aircraft with "vortex generators" to reduce airframe noise unique to this aicraft. Although the A320 is a fully noise-compliant/modern aircraft, this is an excellent example of additional, incremental actions we can take as an industry to reduce impacts on the environment. Attached please find more information related to this technology.

Thank you for your continued work to enhance Boston Logan's operational safety and efficiency, while improving its environmental footprint. If you have any questions or would like to discuss any aspect of this letter, please feel free to contact me or Mr. Flavio Leo, Director of Planning and Strategy, at 617-568-3528.

Edward C. Freni
Director of Aviation

Attachment

An even quieter approach: Airbus introduces air flow deflectors on the A320 Family

Building on the A320 Family's established reputation for quiet operations, Airbus is reducing noise levels even further for its popular single-aisle product line with the introduction of small underwing air flow deflectors. Positioned just ahead of underwing cavities for the fuel over-pressure protection system, these devices prevent the cavities from generating a "whistling" sound which can sometimes be heard on the ground when the engines are at idle during final approach. Air flow deflectors were implemented in production A320 jetliners this spring and are also available as a retrofit modification.

Massachusetts Port Authority
One Harborside Drive
East Boston, MA 02128-2909
Telephone (617) 568-5000
www.massport.com

To: Boston Airline Committee

From: Edward C. Freni
Director of Aviation

Date: June 12, 2019

RE: Update on Single/Reduced-Engine Taxiing and Other Strategies to Reduce Aircraft-Generated Emissions and Noise at Boston Logan

As an important user of Boston-Logan International Airport ("Boston Logan"), you are an essential partner in our efforts to ensure that Boston Logan operates in the safest, most dependable and environmentally responsible manner. Although the aviation industry has been highly successful in reducing noise and emissions, there are additional opportunities to further reduce our environmental footprint.

One action air carriers are taking to reduce noise is the retrofitting of the A320 family of aircraft to reduce airframe noise. I want to congratulate jetBlue in their announcement to retrofit their A320s aircraft with "vortex generators" to reduce airframe noise unique to this airplane type (see attachment). This initiative will provide meaningful reductions in noise that generates community complaints. If your airline is also working towards this retrofit please let us know. I strongly urge you to consider this important improvement to the noise emissions of this family of aircraft.

I understand that single or reduced-engine taxiing is being voluntarily implemented by the vast majority of air carriers at Boston Logan. I write to you to encourage your continued use of this fuel-saving emissions reduction strategy, subject to pilot discretion and to the extent consistent with your established operating safety procedures.

Finally, I encourage your use of idle reverse thrust (or to minimize the use of reverse thrust) on landing, as a second operational measure, again, only at the discretion of the pilot and consistent with your established operational safety procedures. This measure provides noise relief to our nearest neighbors and, at the same time, provides companion benefits to you, such as reducing fuel burn and engine wear. The use of this procedure must be consistent with operational conditions at Boston Logan, including runway surface conditions and whether LAHSO is in use.

Thank you for your continued work to enhance Boston Logan's operational safety and efficiency, while improving its environmental footprint. If you have any questions or would like to discuss any aspect of this letter, please feel free to contact me or Mr. Flavio Leo, Director of Planning and Strategy, at 617-568-3528.

Attachment

JetBlue has committed to add vortex generators to its 138 remaining Airbus A320 family aircraft through 2021

East Boston
Times-Free Press

Page 10 THE EAST BOSTON TIMES-FREE PRESS Wednesday, October 17, 2018

Massport and community applaud JetBlue's plans to retrofit airbus fleet with noise reducing generators

Special to the Times

Last week, JetBlue announced plans to retrofit their entire Airbus fleet with noise-reducing vortex generators. JetBlue is the largest operator at Logan International Airport and this move reflects the partnership between Massport and the airline to reduce aircraft noise to benefit surrounding communities. Massport understands concerns about aircraft noise and has continuously been involved in community discussions with residents and elected officials regarding overflights.

"While the airline industry has benefited from advances in technology and efficiency leading to quieter planes and engines, the work is never done," said Joe Bertapelle, Director Strategic Airspace Programs, JetBlue. "We're pleased to incorporate this advancement across our Airbus fleet and contribute to our communities in a meaningful way as good corporate citizens."

Beginning in 2015, the airline began taking delivery of new aircraft with vortex generators already installed as standard equipped Airbus family aircraft. JetBlue is committing to add the devices to its 138 remaining Airbus A320 family aircraft through 2021. The small devices disrupt wind over ports on the wing which can produce a "whistling" tone during approach into an airport.

Vortex generators will be installed on 130 existing JetBlue A320 aircraft and 8 JetBlue A321 aircraft during their existing scheduled heavy checks with the full fleet wide install expected to be complete in 2021. All future Airbus orders will be delivered with vortex generators already installed.

This extraordinary commitment is a testament to years of advocacy by local elected officials, and JetBlue's ongoing support for the communities where its customers and crewmembers live and work, paralleled JetBlue's own research on the effectiveness of vortex generators.

"Thank you to JetBlue for its leadership in implementing noise-reduction technologies to its entire Airbus fleet," said House Speaker Robert DeLeo. "I'm encouraged that the airline is taking this important step on this issue- one I have advocated for since I was a municipal official. I encourage the other airlines that fly in and out of Logan Airport to follow JetBlue's example."

Working with the community and elected officials, Massport has made efforts over the years in various areas to mitigate the effects of aircraft noise. Currently, Massport and the FAA are working on a groundbreaking RNAV Study led by technical experts at MIT to develop test projects to determine the possibility of noise reducing procedures at Logan. Working with the public and the statutorily created Massport Community Advisory Committee (Massport CAC), Massport has completed an initial phase called Block 1 and are in Block 2. Block 1 resulted in recommendations, which were technically less complex and did not result in shifting of noise from one community to another. Block 2 is looking at ideas that are more complex and that may shift noise.

"JetBlue's new technology to reduce airplane noise will have a positive impact on the communities impacted by flights arriving at Logan," said Senator Joseph Boncore. "This is a great move for the airline and a win for those who have advocated on this issue over the years."

"I'm pleased with JetBlue's efforts to implement noise-reduction technology across its Airbus fleet," Rep. Adrian Madaro said. "Noise pollution has long been a top quality of life concern for residents of East Boston. This investment is a step in the right direction and I implore other airlines to make noise reduction a priority as well."

The Massport CAC spearheaded that Massport prioritize this noise reduction implementation.

In December of 2015, East Boston resident John Nucci was named by Boston Mayor Marty Walsh as a representative of the City of Boston to the Massport CAC. That committee unanimously elected him as their appointment to the Massport Board of Directors.

"As a lifelong resident of East Boston, I know how important it is that Massport push the airlines to develop noise reducing benefits for the surrounding communities," said Massport CAC member and Board member John Nucci. "After hearing from the membership of the Massport CAC, as their appointment to the Massport Board, I was pleased to advocate for the retrofit of fleets to include noise-reducing vortex generators. JetBlue's actions are a positive outcome for all."

"At Massport, we are continuously engaged with the surrounding communities of Logan Airport and appreciate their feedback regarding airplane noise," said Massport CEO Thomas P. Glynn. "We think this is a great step JetBlue is taking toward reducing airplane noise and we are thankful to the airline for making this a priority."

"After hearing from the membership of the Massport CAC, as their appointment to the Massport Board, I was pleased to advocate for the retrofit of fleets to include noise-reducing vortex generators. JetBlue's actions are a positive outcome for all."

jetBlue

JetBlue to Retrofit Airbus Fleet with Vortex Generators

Oct 10, 2018

NEW YORK--(BUSINESS WIRE)-- JetBlue (NASDAQ: JBLU), New York's Hometown Airline™, today announces plans to retrofit its entire Airbus fleet with noise-reducing vortex generators. This move reflects JetBlue's continued commitment to the communities where its customers and crewmembers live and work. Beginning in 2015, JetBlue began taking delivery of new aircraft with vortex generators already installed. JetBlue is committing to add the devices to its 138 remaining Airbus A320 family aircraft through 2021. The small devices disrupt wind over ports on the wing which can produce a "whistling" tone during approach into an airport.

"While the airline industry has benefited from advances in technology and efficiency leading to quieter planes and engines, the work is never done," said Joe Bertapelle, Director Strategic Airspace Programs, JetBlue. "We're pleased to incorporate this advancement across our Airbus fleet and contribute to our communities in a meaningful way as good corporate citizens."

Vortex generators will be installed on 130 existing JetBlue A320 aircraft and eight JetBlue A321 aircraft during their existing scheduled heavy checks with the full fleet wide install expected to be complete in 2021. All future Airbus orders will be delivered with vortex generators already installed. The cost to retrofit the full Airbus fleet is less than $1 million.

About JetBlue

JetBlue is New York's Hometown Airline®, and a leading carrier in Boston, Fort Lauderdale - Hollywood, Los Angeles (Long Beach), Orlando, and San Juan. JetBlue carries more than 40 million customers a year to 103 cities in the U.S., Caribbean, and Latin America with an average of 1,000 daily flights. For more information please visit www.jetblue.com.

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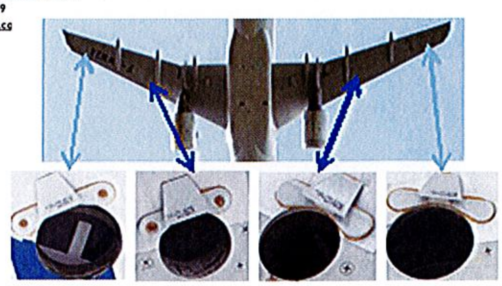

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